

A Dissertation On
THE EFFECT OF FULL WET SHEET PACK ON PULSE RATE, BODY
TEMPERATURE, RESPIRATORY RATE AND PEAK FLOW RATE IN
HEALTHY MALE INDIVIDUALS

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BRANCH – I: NATUROPATHY



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The Institutional Ethical Committee of Government Yoga & Naturopathy Medical College and Hospital, Chennai reviewed and discussed the application for approval of “THE EFFECT OF FULL WET SHEET PACK ON PULSE RATE, BODY TEMPERATURE, RESPIRATORY RATE AND PEAK FLOW RATE IN HEALTHY MALE INDIVIDUALS”, project work submitted by Dr. T. Poornima, 2nd year M.D. Naturopathy, Post graduate, Government Yoga and Naturopathy Medical College and Hospital, Chennai.

The proposal is APPROVED.

The Institutional Ethical Committee expects to be informed about the progress of the study and adverse drug reactions during the course of the study and any change in the protocol and patient information sheet / informed consent and asks to be provided a copy of the final report.

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ABSTRACT

BACKGROUND:

FULL WET SHEET PACK:

This is extremely useful and applicable hydriatic procedure, in which the patient is enveloped with cold wet sheet and then the sheet is covered with dry blanket wrappings to regulate the temperature and to control evaporation. Full wet sheet pack is a hydrotherapeutic procedure practiced in Naturopathy. In this the volunteers are made to lie down and safely wrapped in Full wet sheet pack to access the physiological effect produced by it in the same atmospheric condition. The present study was conducted to evaluate whether the Full Wet Sheet Pack has any physiological effect on Pulse Rate, Body Temperature, Respiratory Rate and Peak Flow Rate in healthy male individuals.

RESULT:

The experiment result showed a significant improvement in Pulse Rate, Respiratory Rate, Peak Flow Rate ($p < 0.05$), whereas no significant improvement in the body temperature ($p > 0.05$).

KEY WORDS:

Wet sheet pack, pulse rate, respiratory rate, peak flow rate and body temperature.

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1. INTRODUCTION

Naturopathy comprises a traditional system of healing based on philosophical principles vogue to ancient India. Many techniques of Naturopathy system like ushapanam and upvas (fasting) were part of routine living practices peculiar to early days. Ancient scriptures like *Vedas* give us a comprehensive detail about these practices^[1].

Naturopathy is a system of health care. It is called as science of healthy living.

It is a drugless system of healing based on well founded philosophy.

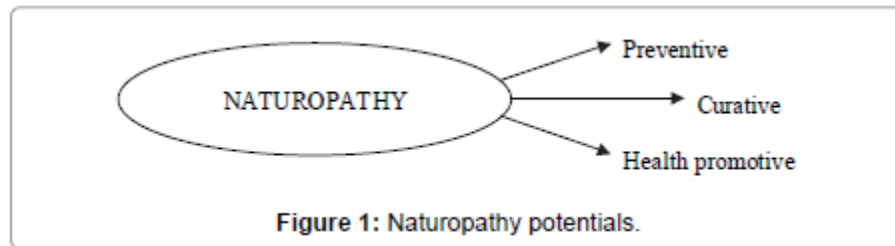
Naturopathy has its own concepts of health and disease and also principles of treatment.

It lays more importance on the preventive aspect of health care rather than curative one.

This is one of the reasons that Naturopathy system is gaining popularity day by day.

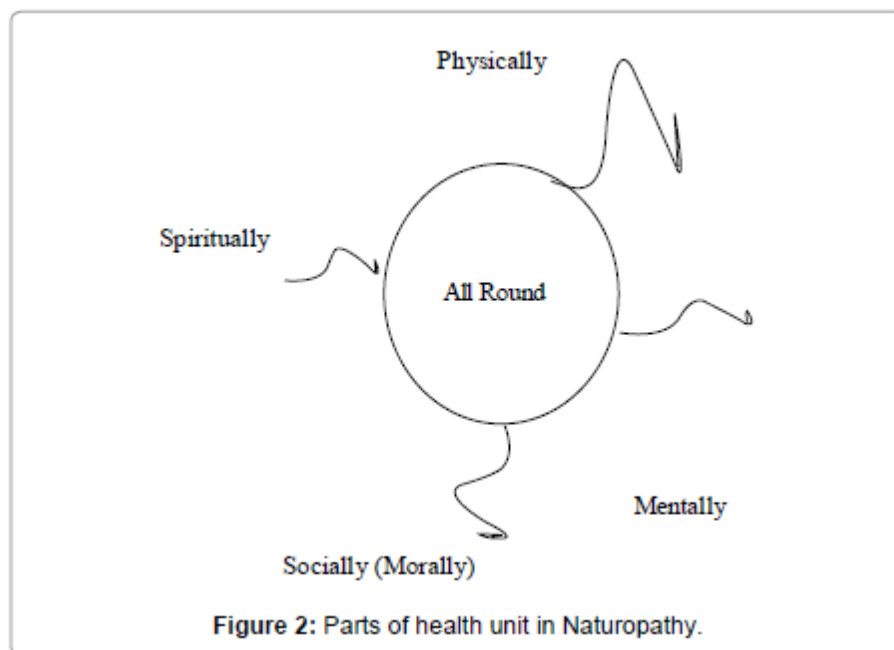
Naturopathy is a system of man building in harmony with constructive principles of nature on physical, mental, moral and spiritual planes of living.

It has great deal as preventive and curative as well as restorative potential ^[2]
(Figure 1).



Naturopathy is also defined as a system of medicine for cure of diseases by encouraging natural curative reactions inherent in every diseased cell through methods and treatments based upon the fundamental laws which govern health.

Naturopathy is basically a preventive system of treatment. It believes that man is a complete health unit and treat the body physically, mentally, socially (morally) and spiritually for all round health ^[3]. If one follows the laws of nature he may prevent himself from various diseases (Figure 2).

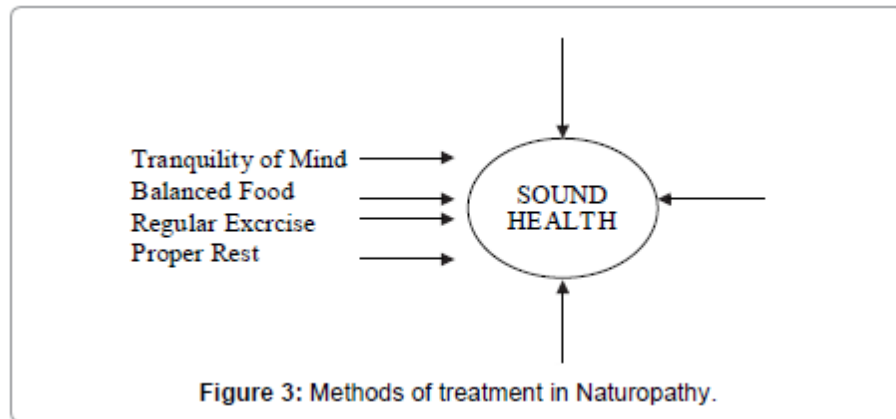


According to Naturopathy as defined by Lindlahr ^[4], “The primary cause of disease, barring accidental or surgical injury to the human organism and surroundings hostile to human life, is violation of Nature’s laws. The effects of violation of Nature’s laws on the physical human organism are:

- Lowered Vitality
- Abnormal composition of blood and lymph
- Accumulation of waste matter, morbid materials and poisons”

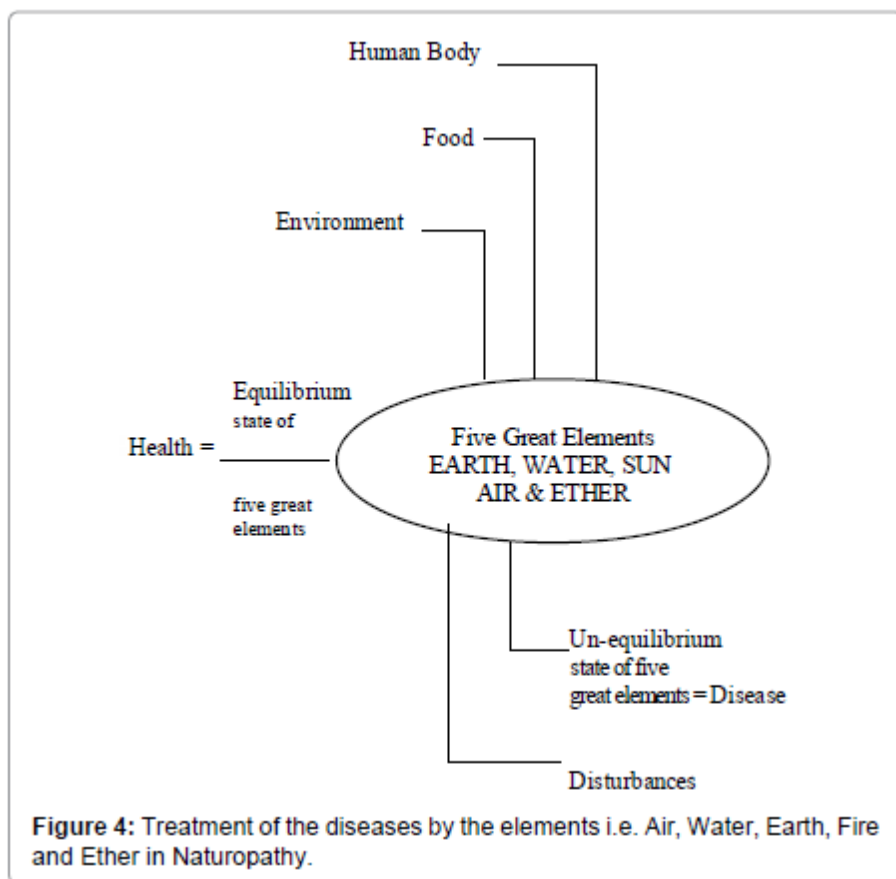
To prevent the diseases one has to obey the universal laws of nature in life by adopting the natural methods of living and of treatment. These methods which are applicable in the prevention and management of most of the disorders have been described by Lindlahr ^[4], as under:

- **Return to Nature** by the regulation of eating, drinking, breathing, bathing, dressing, working, resting, thinking, the moral life, sexual and social activities, etc., establishing the man a normal and natural basis.
- **Elementary remedies**, such as water, air, light, earth cures, magnetism, electricity, etc.
- **Chemical remedies**, such as scientific food selection, simple herb extracts.



1.1 MODALITIES OF NATUROPATHY:

The main modalities of Naturopathy are comprised of:



1.2. HYDROTHERAPY

Hydrotherapy, formerly called as hydropathy and also called as water cure is a part of alternative medicine particularly in naturopathy which is regarded as a drugless therapy. It is based on the rational use of elements which is freely available in the nature.

Water is a main component of Naturopathy. It is an ancient method of treatment used mainly for preserving health, relieving the inner congestion [10] and curing different types of diseases. Taking bath in clean and fresh water is very effective as it opens up the pores of skin, imparts lightness and alertness to the body, all systems and muscles of body are activated and the blood circulation improves.

It is believed that the old tradition of taking bath in rivers, ponds or water falls on specific occasions in India is virtually a form of Hydrotherapy only. Hip bath, Enema, Hot and Cold fomentation, Hot foot bath, Spinal bath, Steam bath, Immersion bath, Hot and Cold packs on Abdomen, Chest and other parts of the body are the recent developments in Hydrotherapy.

Hydrotherapy is one such a wonderful therapy which involves a broad range of approaches and therapeutic measures, that take the advantage of physical properties of water such as temperature and pressure for the therapeutic purposes to maintain health and treat diseases.

The use of water for treatment purposes was as old as mankind. It was widely accepted and used treatment modality in ancient cultures including Indian, Egyptian, Chinese, Greek and Romans.

In this therapy water is used in any of its forms [water, ice, steam] either externally or internally for health promotion or treatment of various diseases with various temperatures, pressure, duration and site.

1.3. FULL WET SHEET PACK:

Full wet sheet Pack this is extremely useful and applicable hydriatic procedure, in which the patient is enveloped with cold wet sheet and then the sheet, is covered with dry blanket wrappings to regulate the temperature and to control evaporation.

In naturopathy, application of Full wet sheet pack for 45 min is believed to improve and regularize the lung functions, Pulse Rate, body temperature and Respiratory Rate. For scientific evaluation of this treatment, a study was carried out on 30 male healthy volunteers with ages from 19 to 25 years. The peak expiratory flow rate (PEFR, in l/min) Pulse Rate, body temperature was recorded before, during and after a 45 min application of Full wet sheet pack. This is a first study to develop more extensive studies on large samples to understand and apply the same in clinical used.

2. AIMS AND OBJECTIVES

2.1. AIM:

The aim of this study is to assess the effect the Full wet sheet pack on pulse rate body temperature, respiratory rate and peak flow rate in healthy male individuals.

2.2. OBJECTIVES OF THE STUDY:

To evaluate the effect of full wet sheet pack on

- Pulse rate
- Body temperature
- Respiratory rate
- Peak flow rate

3. REVIEW OF LITERATURE

3.1. BASIC PROPERTIES OF WATER:

It has ability to communicate and absorb large quantities of heat by contact.

The temperature of water has conducting capacity needed to produce thermic stimulation.

The fluidity of water has the capability to produce mechanical stimulation.

The solvent property of water is useful to produce nutritive and metabolic changes.

Existence of water in 3 states of matter (within a short range of temperature) helps in applying it to the body in all 3 states.

BASIC PRINCIPLES AND EFFECTS OF HYDROTHERAPY

Effect similar to these produced by thermic impressions can be obtained by sunlight, friction the basic principle of hydrotherapy is found chiefly in an explanation of the effect of heat and cold.

This is most notably true of light, many of the physiologic effect of which run parallel with these of hydrotherapy. (the science is that of thermo therapy.

CLASSIFICATION OF TEMPERATURE:

The temperature varies from one man to another. For example, immersion of hand in water at 70degree F gives COLD but for the entire body gives VERY COLD.

Full tub bath at 105 degree F is very hot and to one hand is moderate.

STANDARD NOMENCLATURE OF TEMPERATURE:

1. VERY HOT - 104 degree to above degrees.
2. HOT - 100 degree to 104 degree.
3. WARM (NEUTRAL : 92 - 97 degree) - 92 degree to 100 degree.
4. TEPID - 80 degree to 92 degree.
5. COOL - 70 degree to 80 degree.
6. COLD - 55 degree to 70 degree.
7. VERY COLD - 32 degree to 55 degree.

TACTILE SENSE IN THE BODY:

The acuteness of the pressure sense is different parts of the body is in the following order.

Beginning with most sensitive area.

- ✓ The forehead.
- ✓ Lips.

- Cheeks.
- Temples.
- The back of the fingers and fore arm.
- The anterior surface of legs and thigh.
- The back of feet.
- The toes.
- The soles of the feet.
- The posterior surface of the legs and thigh.

The nerves of touch are connected with the motor centers controlling the muscles of the corresponding part.

THE TEMPERATURE SENSE OF THE BODY:

- This is one of the most interesting functions of skin and most profound effects are the results, from the thermic application upon temperature nerves and cerebrospinal and sympathetic system.
- The temperature sense is not uniformly distended to the skin, but is confined to certain spots. Two kinds of spots that is Hot spots and Cold spots.
- These are arranged in curved lines starting from the hair roots
- These spots are hot sensitive to impression of pain or pleasure.

PHYSIOLOGICAL EFFECTS OF WATER ON DIFFERENT SYSTEMS OF THE BODY:

GENERAL AND PHYSIOLOGICAL ASPECTS OF HEAT UPON

Physiological Effect of water depends upon

- The mode of application
- The temperature
- The duration
- The condition of the subject

I. SKIN :

DILATION OF CAPILLARY VESSELS

Influence of heat upon vasomotor nerves



Vasoconstriction and stimulate vasodilatation

CURRIE observed following effects in application of heat over skin

- Moderate heat (99 – 101 F) -Surface vessels relaxed
- Very hot (>- 104 F) - vascular contraction in skin
- Higher temperature (110 – 130 F) - 1st produce pallor of skin due to vasoconstriction – goose flesh appearance and shivering.
- High temperature (very hot water) leads to vasoconstriction that may help in arresting hemorrhages and capillary oozing, for such purpose temperature from 120-160 degree F is used.

- Hot application to the skin increases the activity of gland of skin (sweat and sebaceous) .

II. THE EFFECTS OF HEAT UPON THE CIRCULATION:

- Increases activity of heart and dilates the cutaneous vessels, leading to loosening arterial tension, quickening of the pulse, increases the perspiration.
- Very hot application – 1st stimulates the vaso - constriction and causes the contraction of the small blood vessels in the peripheral surface leading to sudden increase in the force and tension of the pulse.
- Stimulation of vasoconstrictor of the skin causes temporary excitation of the heart leading to intense congestion of internal viscera, sensation of throbbing and fullness in the head, visible beating and pulsation of vessels of throat and temples with flushing of cheeks.

III. EFFECTS OF HEAT UPON THE RESPIRATION:

- General application of heat raises the temperature of the blood causes excitation of heat controlling centers leading to increases in lung activity and respiration which is called as heat dissipation.
- General application of heat in the form of moist heat not by the dry heat or dry hot air increases the rate and facility of the respiratory movements.
- Moist heat produces increase chest movements probably due to lessened CO₂ elimination but doesn't indicate an increase of oxidation in the body.

IV.EFFECTS OF HEAT UPON NERVOUS SYSTEM:

- Heat may excite or exhaust the nervous system according to the mode of application.
- The effect of neutral bath is to diminish nervous irritability thus producing true sedative effect.
- Baths at high temperature (> 100 F) produce, first, very excite effects, manifested by nervousness, headache, etc late, symptoms of exhaustion appear.
- EXCITANT EFFECTS are due to the direct influence of heat upon the nerve filaments and other tissues
- EXHAUSTING EFFECTS are due to protoplasmic or vital activities of the body are excited by certain forms of hot application.

V. REFLEX EFFECTS PRODUCED BY THE APPLICATION:

- Special reflex effects are obtainable by the hot application to certain areas of the skin which sustains a known reflex to the internal viscera.
- These effects are obtained through the impression made on the ganglia of the great sympathetic and the vasomotor and other ganglia of the cord.
- Warm or hot water stimulates vasodilators and produces desired reflex effects in the internal viscera when it is applied in the following regions.
 - ✓ To The face and back of neck in Brain.
 - ✓ To Upper part of the spine, chest in lungs.

- ✓ To Hand and feet in brain, mucous membrane of nose and organ of chest.
- ✓ To Middle dorsal region in stomach.
- ✓ To Breast in uterus.
- ✓ To Skin of lumbar region in kidneys.
- ✓ To Lower lumbar region in uterus and lower extremities.
- ✓ To Plantar region in uterus.

VI. THE EFFECTS OF HEAT UPON THE BODY TEMPERATURE AND HEAT PRODUCTION:

- Warm air increases heat production.
- An external temperature a few degree above the body temperature may increase heat production more than 300 %
- This fact leads to heat strokes, thermic fever
- A rise of 20 degree F in external temperature will give out the way to rise 1 F Body temperature.

VII. GENERAL PHYSIOLOGICAL EFFECT OF COLD UPON THE SKIN:

- Contraction of the small blood vessels.
- Decrease or suspension of perspiration.
- Decreased heat elimination and increased heat production.
- Diminished tactile sensibility.

VIII. EFFECT OF COLD UPON THE CIRCULATION:

- Cold slow the circulation and diminish the frequency of heart beat.
- Very short application of cold increase the activity of heart.
- Prolonged cold slows the action.
- Prolonged cold - vasoconstriction.
- Short very cold – elevation of blood pressure.

IX.EFFECTS OF COLD UPON THE RESPIRATION:

RESPIRATORY MOVEMENTS

- Cold full bath – decrease respiratory rate.
- Cold to douch or spray - increase the respiratory rate.

X. EFFECTS UPON THE NERVOUS SYSTEM:

- Cold application to nerve trunk - greatly diminish or entirely abolish its functioning or paralyzing the part
- Neutral water to brain has no effect
- Ice to the scalp causes contraction of cerebral blood vessels leading to chillness and shivering
- Cold compress to spine and abdomen or full bath causes instant dilation of cerebral vessels
- Cold application to nerve trunk produces contraction of cerebral vessels

THE UNTOWARD EFFECTS OF HYDROTHERAPY:

- The most common of the unpleasant effects of the applications might have been Head ache commonly followed by cold plunge, cold douche or hot air bath than any other treatment.
- Condition may be due to congestion, anemia, reflex or sympathetic stimulation and over stimulation of sympathetic nerves
- In headache is followed by hot bath, it may be due to (either congestion or anemia) an irritation of the ganglion cells or excitation of the nerve endings in the brain.
- Vertigo and sweating may occur with or without headache and due to strong reaction. Vertigo is due to same cause of headache.
- Sweating of the head is due to strong stimulation of blood in this part.
- Insomnia, nervousness, wandering pain, palpitation, uneasiness, unpleasant sensation following a bath indicates the necessity for employment of less strongly excitant measures.
- Insomnia can be overcome by neutral bath instead of cold douche.
- Most tonic applications can be given in forenoon instead of given in afternoon.
- Pain generally expressed at certain points and care should be taken to avoid, exciting or tonic applications to these points.
- Care should be taken on hysterogenous zones, especially abdomen where the patient may feel decided pain or tenderness and application of cold water will precipitate an attack.

- Hot and cold application to spine and neutral bath will give good relief from this attack.
- In such cases, cold application can be started with 75-80 F and day by day it can be reduced as the patient gains power to reaction.
- Continuous use of cold water hardens the skin and increases its resistance.
- Great care must be taken to dry the skin thoroughly after baths of all sorts. Colds, sore throats and catarrh of the nose and throat are usually due to reflect completely to dry the skin, thus exposing the patient to secondary chill and resulting visceral congestion and acute catarrh, which very readily becomes chronic.
- Hot scotch douche, an electric bath or some other form of sweating bath may precede cold application in those cases.
- Rheumatic pain happens due to incomplete reaction and setting free of uric acid as irritating substance in the blood.
- The prolonged application of dry cold by means of rubber bag filled with ice, are often the cause of rheumatic pains.
- The skin diseases such as suppurating pimples or furuncles, erythemas or acute eczemas indicate that neutral bath should be employed instead of cold bath.
- Due to too violent measures or strong measures employed for too great a length of time.

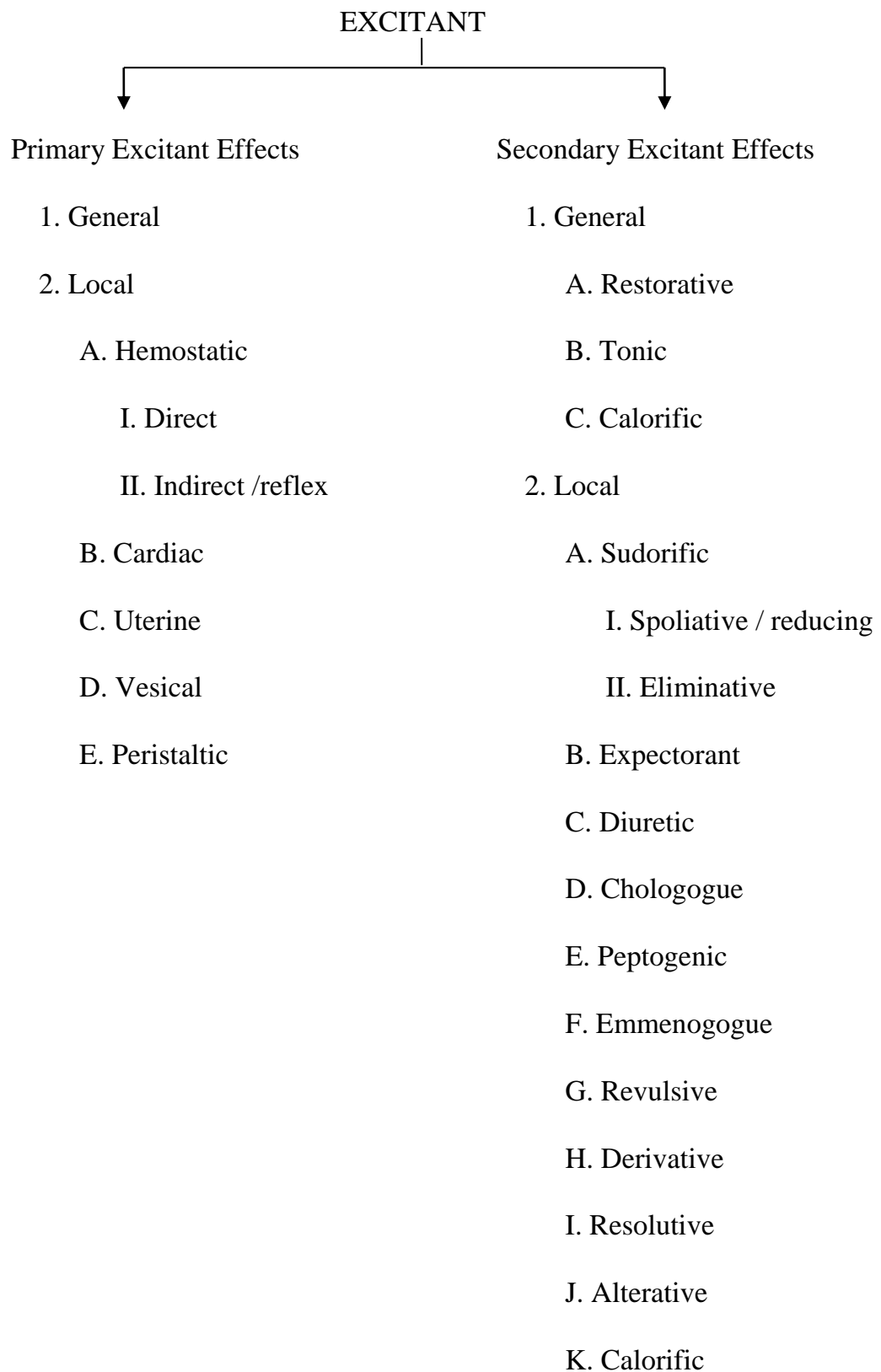
- The principle symptoms of crisis are fever, boils, suppurating eruptions, salivation, hemorrhoids, diarrhea and vomiting.
- Application of too strong measures to the surface gives rise to eruptions and irritations of boils etc.

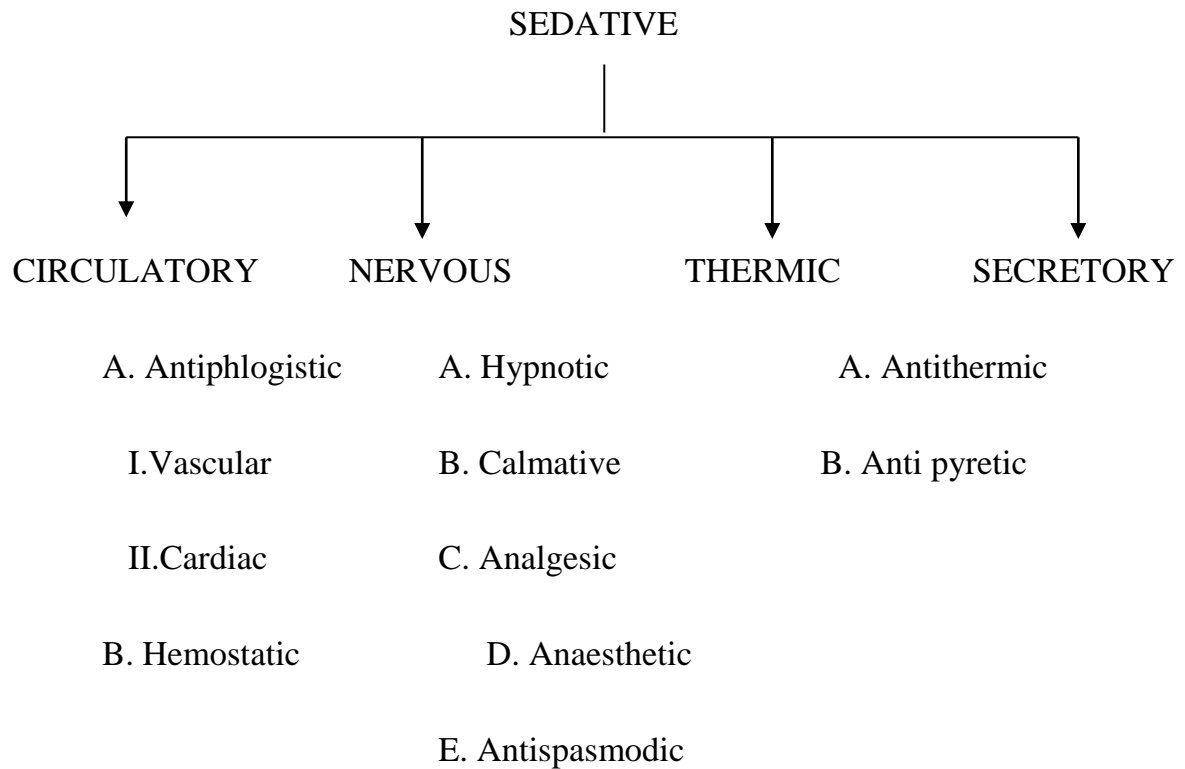
CLASSIFICATION OF HYDRIATIC EFFECT

Two classes of effects are produced by water based upon its physiological effects

1. Excitation (Excitant Effect)
2. Depression (Sedative Effect)

CLASSIFICATION OF HYDRIATIC EFFECTS:





3.2. PULSATION IN THE BLOOD VESSELS:

Pulsations are present in blood vessels from the Aorta up to the arterial end of the capillaries, beyond this point there is no pulsation. The pulse wave is very prominent in large arteries and is completely absent in the veins, except in the jugular vein.^[12]

3.3. ARTERIAL PULSE:

Pulse is the expansion and elongation of the arterial walls, produced by the pressure changes during Systole and Diastole and transmitted along the arterial wall as a wave.^[13]

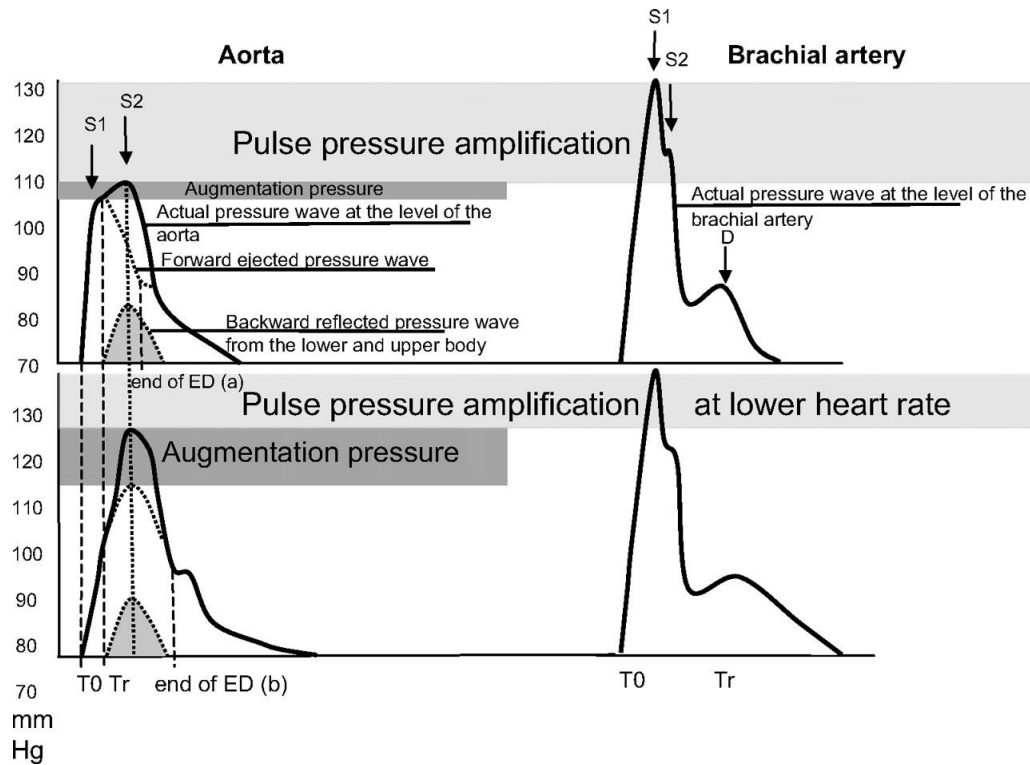


Fig : 5 Arterial Pulse

3.4. VELOCITY OF TRANSMISSION OF PULSE:

The rate at which the wave travels, it is much higher than the velocity of blood flow.

1. 4 m/sec in the Aorta.
2. 8 m/sec in the Large arteries.
3. 16 m/sec in the Small arteries of young adults.

3.5. DELAY IN TRANSMISSION OF PULSE:

The delay is very minimal and it can be accurately measured by accurate recording. The delay is directly proportional to the distance from the heart.

1. Common Carotid Artery: 0.01 to 0.02 sec.
2. Radial Artery: 0.08 sec.

3.6. NORMAL PULSE RATE:

1. In fetus : 150 – 180 beats/min
2. At Birth : 130 – 140 beats/min
3. At 10 years : 90 beats/min
4. Puberty : 72 beats/min (60 – 80 beats/min)

3.7. REGULATIONS OF ARTERIAL PULSE:

It is regulated by Nervous mechanism,

1. Vasomotor centre
2. Motor (Efferent) Nerve fibers to heart
3. Sensory (Afferent) Nerve fibers from the heart

3.8. VASOMOTOR CENTRE:

It is the centre which regulates the heart rate.

Situation:

It is bilaterally situated in the reticular formation of medulla oblongata and lower pons.

Area:

1. Vasoconstrictor area
2. Vasodilator area
3. Sensory area

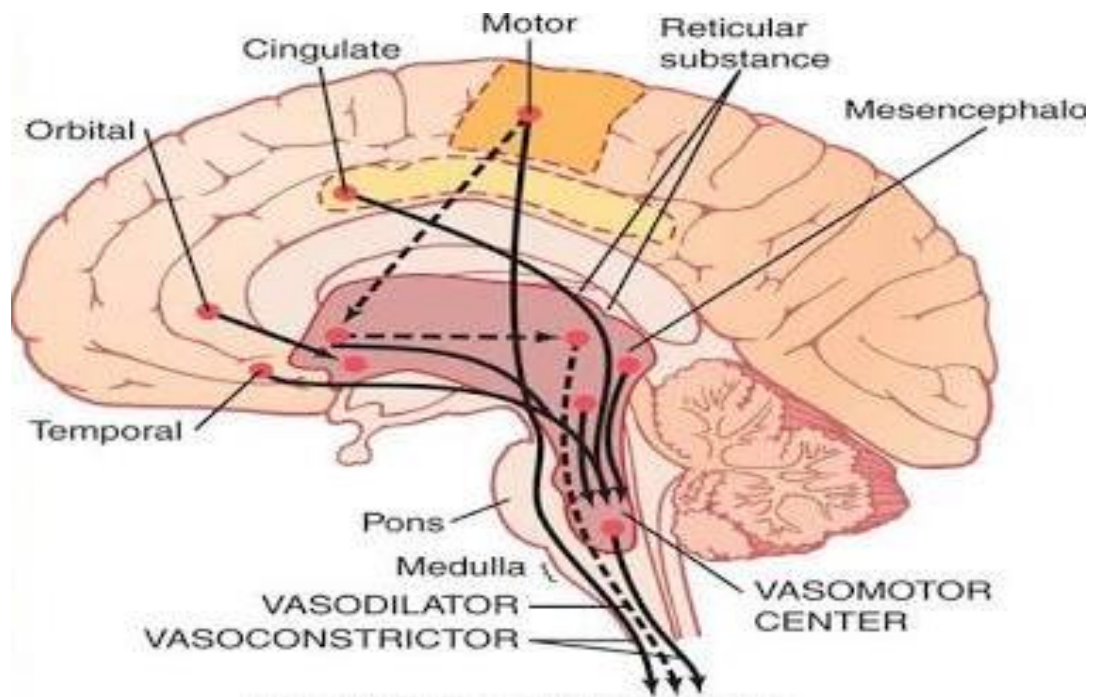
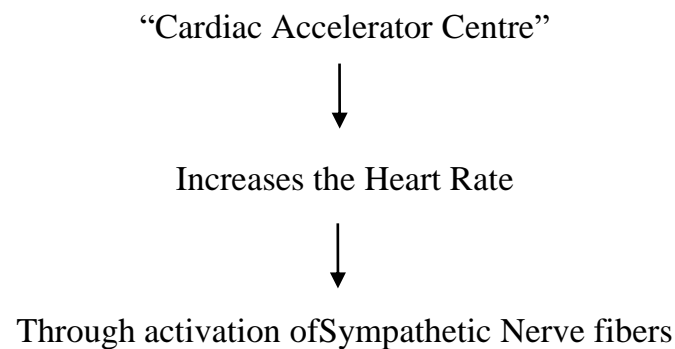


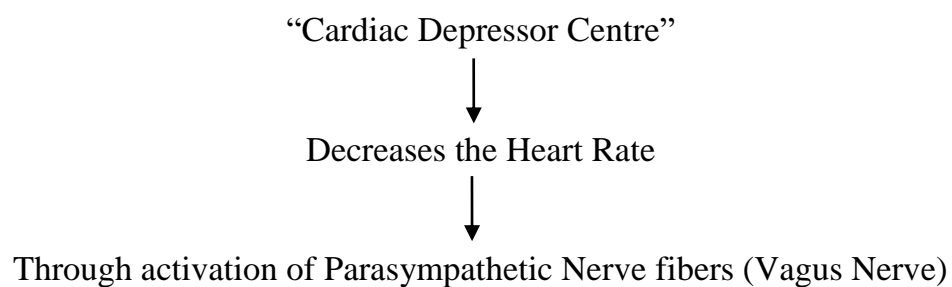
Fig :6Vasomotor Center in the Brain and Its Control of the Vasoconstrictor System.

Vasoconstrictor area:

It is situated in reticular formation of medulla in the floor of fourth Ventricle.



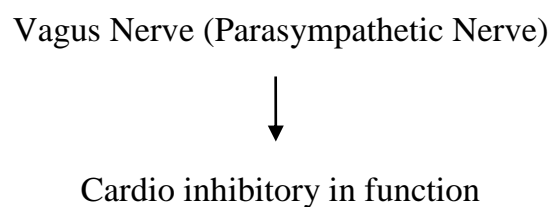
Vasodilator area:



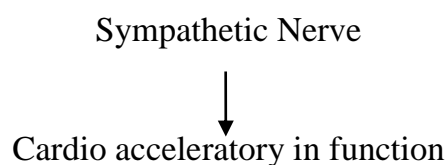
Sensory Area:

It controls the vasoconstrictor and vasodilator area.

Motor Efferent Nerve fibers to Heart:



Sensory Afferent Nerve fibers from Heart:



Blood pressure

- Pulse pressure: PP = systolic pressure - diastolic pressure.

- Mean arterial blood pressure (MABP)

$$\text{MABP} = \text{Diastolic} + \frac{\text{pulse pressure}}{3}$$

Cardiac output(CO)

Total peripheral resistance(TPR)

$$\text{ABP} = \text{CO} \times \text{TPR}$$

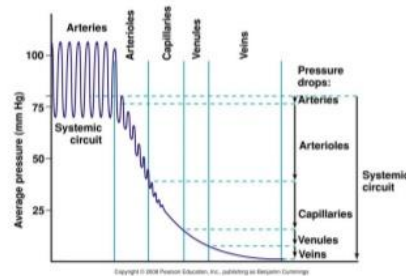
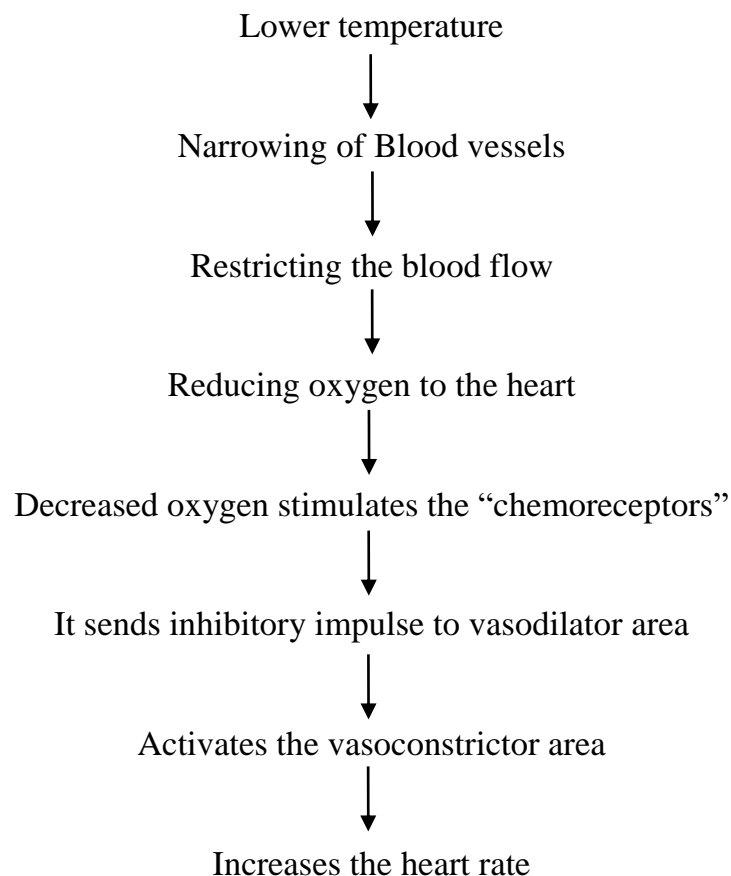


Fig :7Regulations of Arterial Pulse

3.9. EFFECT OF COLD ON PULSE RATE/HEART RATE:

- It increases the Heart rate
- It makes the work much harder to keep the body warm



3.10. BLOOD PRESSURE:

It is defined as pressure that is exerted by the blood up on the walls of the blood vessels.

Blood pressure usually expressed in terms of,

- ✓ Systolic pressure (maximum pressure exerted during the systole of heart).
- ✓ Diastolic pressure (minimum pressure exerted during the diastole of heart).

3.11. Normal Blood Pressure:

Blood Pressure: 120/80 mm/Hg

Range :

Systolic – 100 to 140

Diastolic – 70 to 90

3.12. Regulation of Blood Pressure:

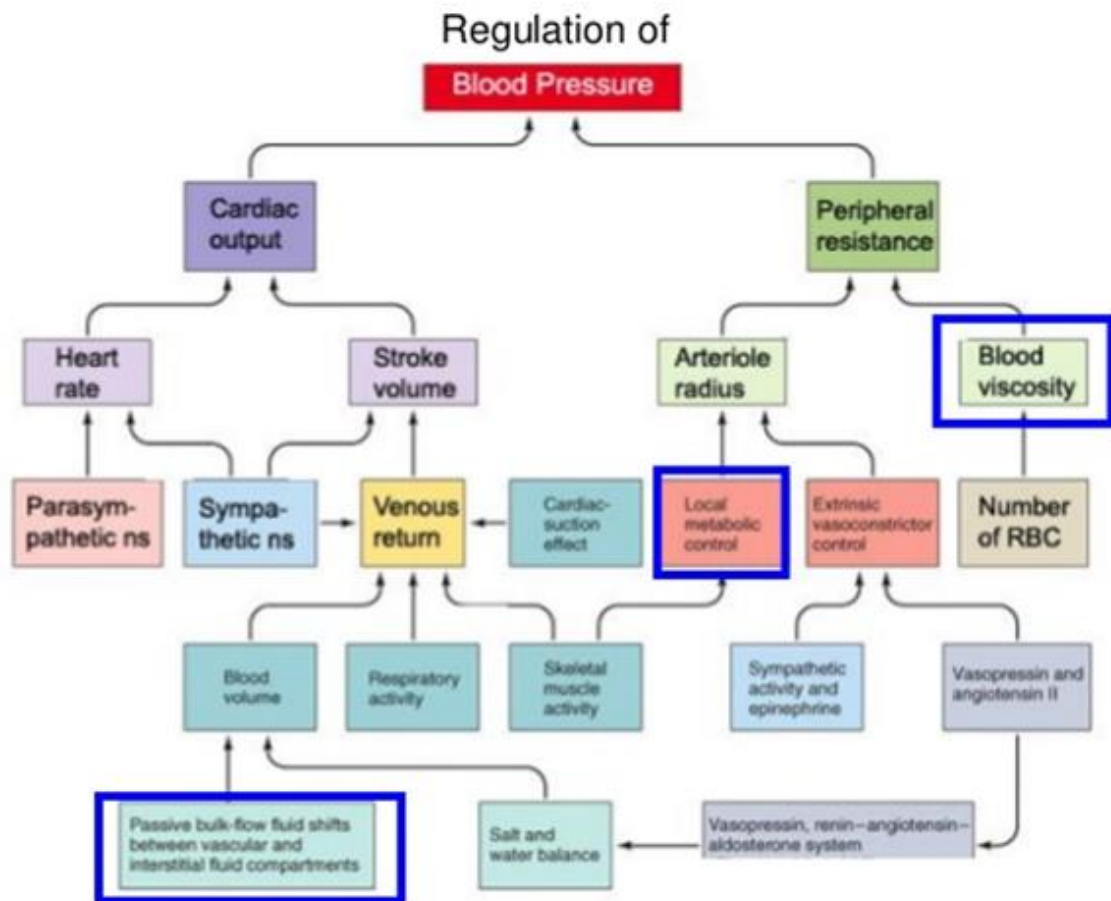


Fig:8: Regulation of Blood Pressure

Two base mechanism for regulation of Blood Pressure,

- ✓ Short term regulation
- ✓ Long term regulation

Short term regulation:

It regulates blood vessels diameter, heart rate and contractility.

Long term regulation:

It regulates the blood flow

3.13. BARORECEPTOR REFLEX:

High receptor zones detect changes in the arterial blood pressure



Baroreceptors send signals to medulla of brain stem



Adjust the Mean Arterial Blood Pressure



Altering both force and speed of heart contractions

3.14. RENIN ANGIOTENSIN SYSYTEM:

Long term adjustment of arterial blood pressure



It acts on kidneys to compensate the loss in blood volume or drop in
arterial blood pressure



By activating ANGIOTENSIN II (Vasoconstrictor)

3.15. ALDOSTERONE RELEASE:

Released from Adrenal Cortex in response to ANGIOTENSIN II



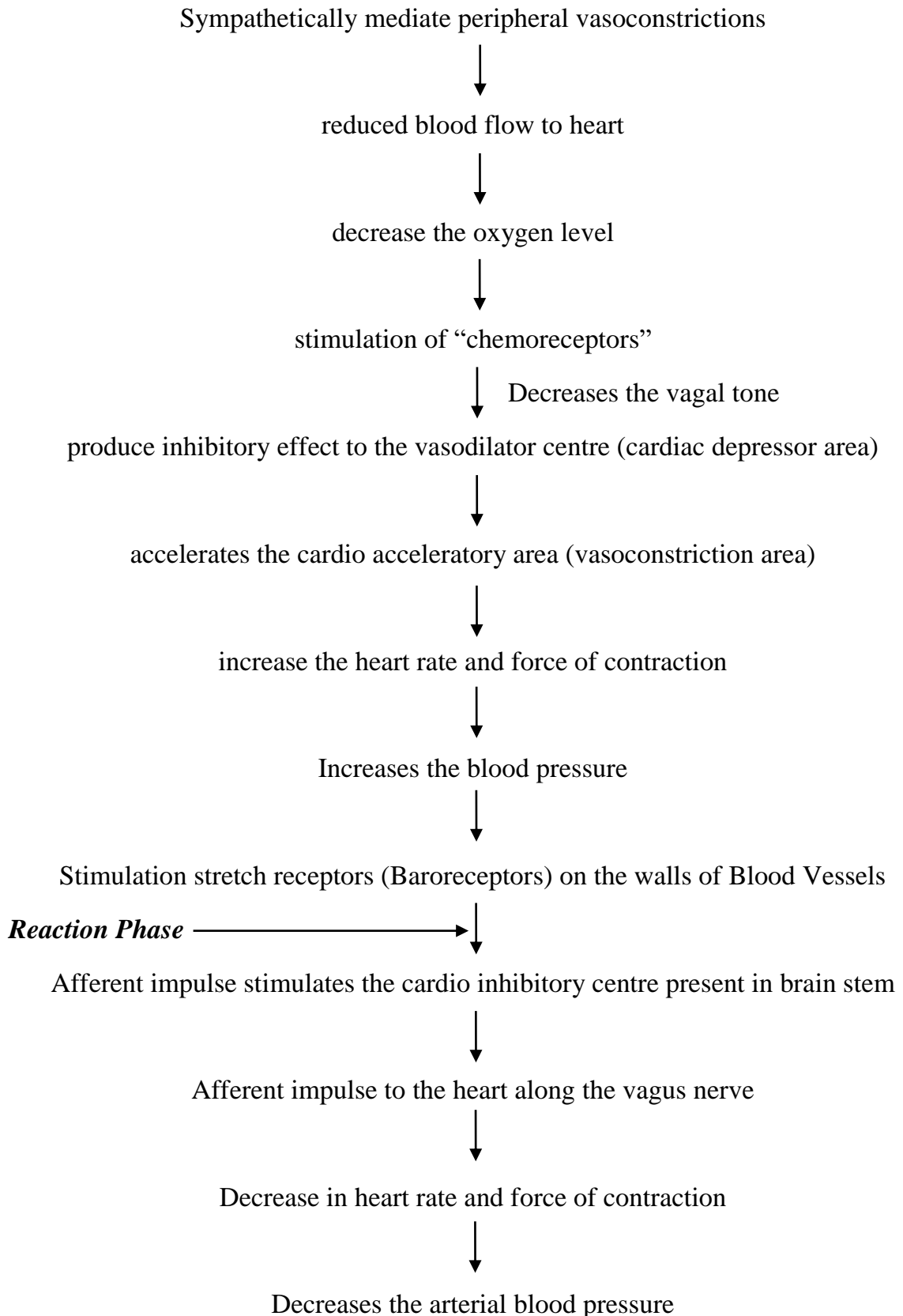
It stimulates Sodium retention and Potassium excretion by the kidneys



Thereby indirectly increasing the Arterial Blood Pressure

3.16. EFFECT OF COLD ON BLOOD PRESSURE:

Initial/Action Phase



3.17. RESPIRATORY RATE:

Respiratory rate means number of breaths per minute or cycles of inspiration and expiration per unit time.^[14]

Normal Values:

- ✓ Birth to 6 weeks : 30 – 40 cycles/min
- ✓ 6 months : 25 – 40 cycles/min
- ✓ 3 years : 20 – 30 cycles/min
- ✓ 6 years : 18 – 25 cycles/min
- ✓ 10 years : 17 – 23 cycles/min
- ✓ Adults : 12 – 18 cycles/min
- ✓ Elderly ≥ 65 : 12 – 28 cycles/min
- ✓ Elderly ≥ 80 : 10 – 30 cycles/min

3.18. REGULATION:

Respiratory centres are situated in the reticular formation of brain stem.

- ✓ Medullary centers
- ✓ Pontine centers

Medullary centers:

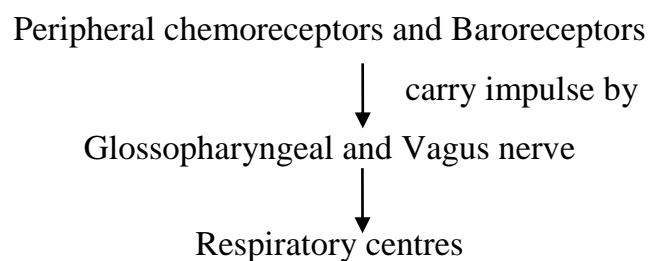
- Inspiratory centers: upper part of medulla oblongata
 - dorsal group of respiratory neurons
 - Function is inspiration
- Expiratory centers: lateral to inspiratory center
 - Ventral group of neurons
 - Inactive during quiet breathing activated during forced breathing.

Pontine centers:

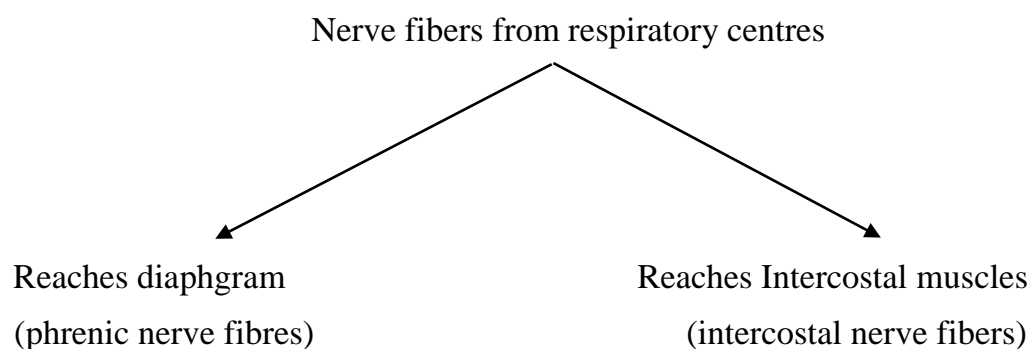
- Pneumotaxic center
 - Upper pons
 - Controls medullary respiratory centers through apneustic centers
 - Duration of inspiration is controlled
- Apneustic center:
 - Situated in lower pons
 - Increases the depth of inspiration acting directly on inspiratory centre

Nervous connections:

Afferent pathway:

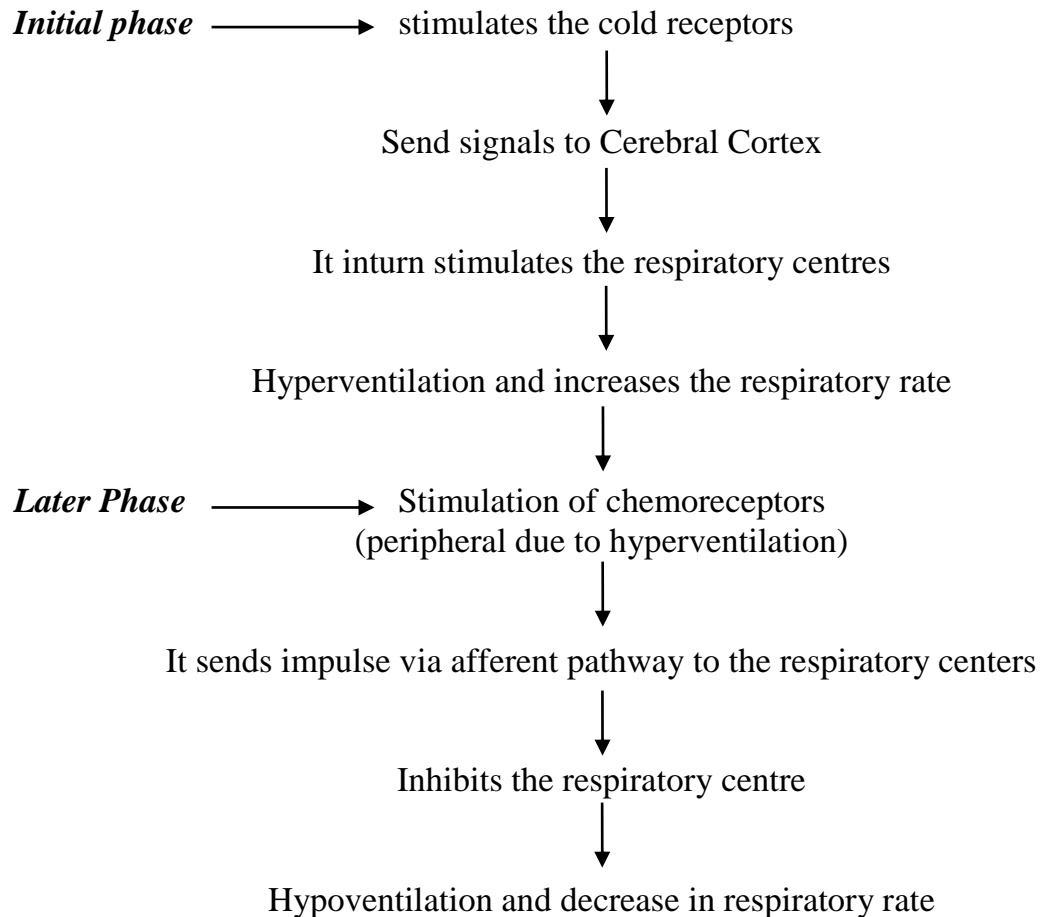


Efferent pathway:



3.19.EFFECT OF COLD ON RESPIRATORY RATE:

Thermoreceptors:



Neural Regulation of Respiration

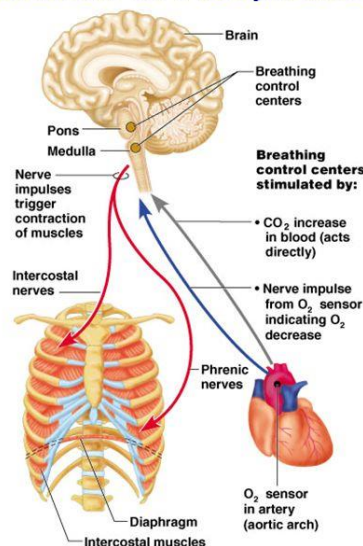


Fig: 9. Neural Regulation Of Respiration

3.20. BODY TEMPERATURE:

Body temperature is defined as the average temperature of the human body.

In humans, this average temperature is estimated at around 36.8 °C to 38°C, although this can vary depending on time of day, typically by 0.5°C in the evening compared to the morning.^[15]

Normal Body Temperature:

18 to 40 years of age,

Oral : 37.5 °C (99.5 °F)

Axilla :37.2°C (99°F)

Rectal :38°C (100.4°F)

Regulation of Body Temperature:

A normal body temperature is regulated by hypothalamus, it has two centres,

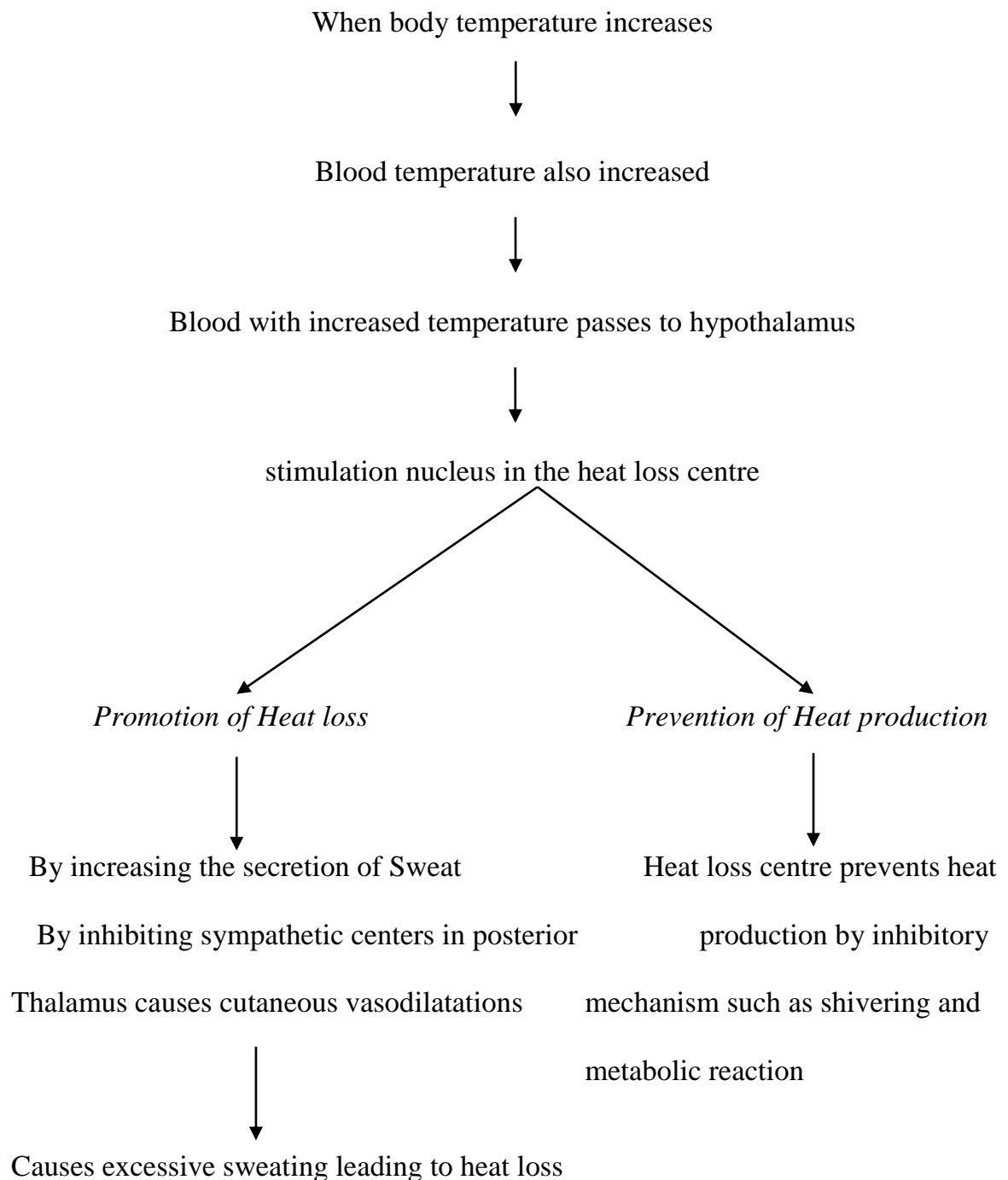
- Heat Loss Centre

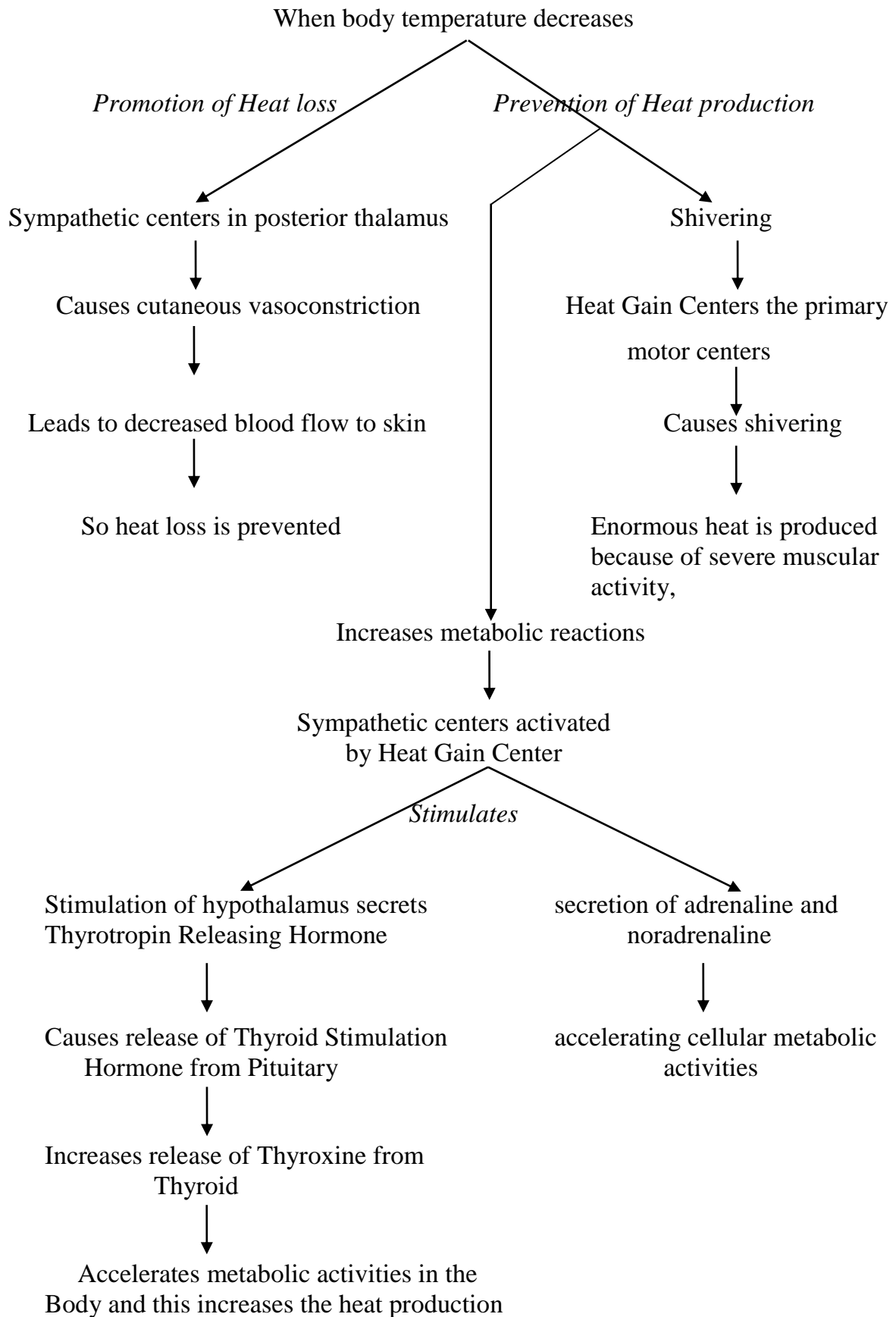
Situated in the preoptic nucleus of anterior hypothalamus (Thermoreceptors), which stimulates cutaneous vasodilatation and sweating (lesions leads to increase in body temperature)

- Heat Gain Centre

Situated in posterior hypothalamic nucleus which stimulates shivering (lesions leads to fall in Body temperature)

Mechanism:





Mechanisms of Body Temperature Regulation

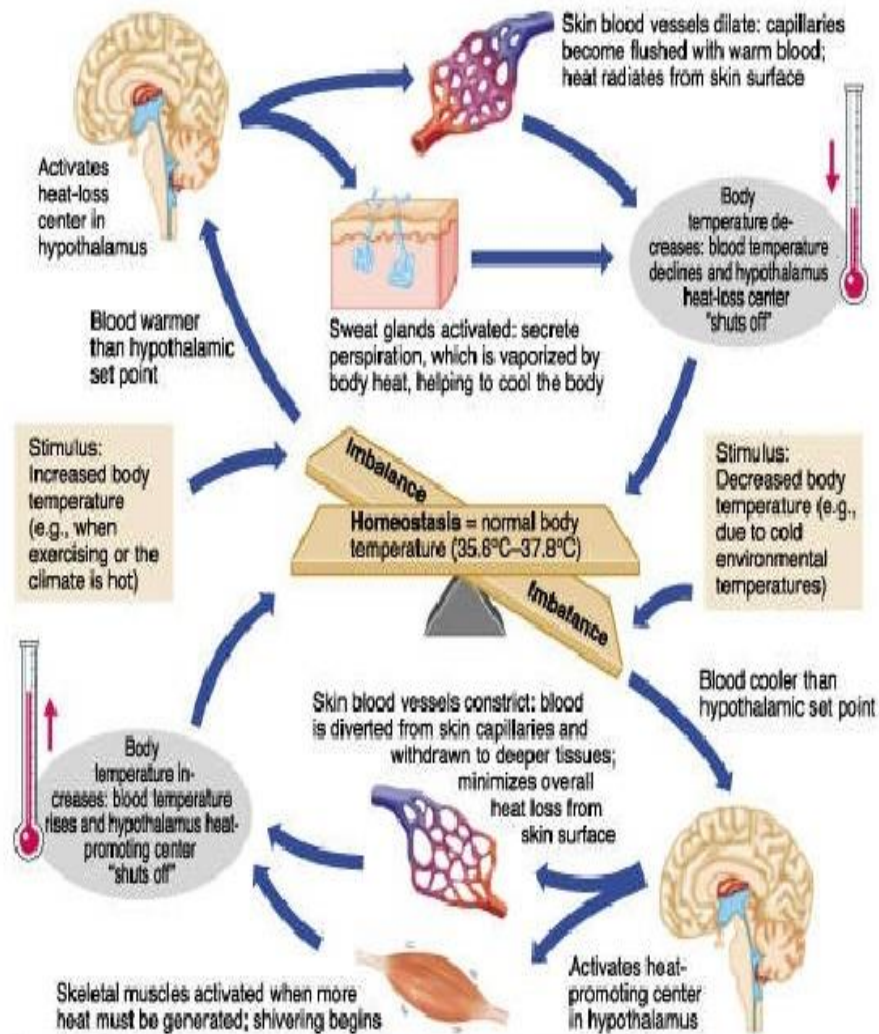


Fig: 10 Mechanisms of Body Temperature Regulation

3.21. PEAK EXPIRATORY FLOW RATE - NORMAL VALUES

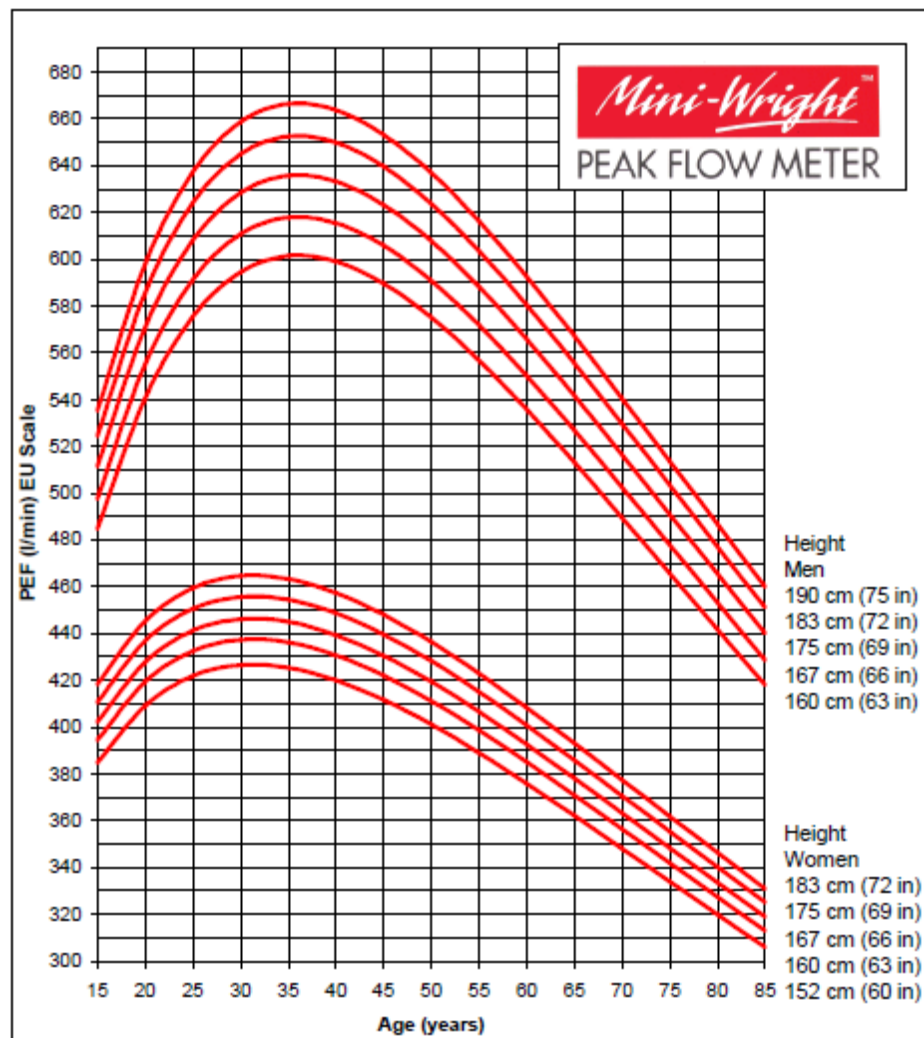


Fig: 11. Peak Expiratory Flow Normal Value

In men, readings up to 100 L/min lower than predicted are within normal limits.

3.22. FULL WET SHEET PACK:

Full wet sheet Pack this is extremely useful and applicable hydropathic procedure, in which the patient is enveloped with cold wet sheet and then the sheet, is covered with dry blanket wrappings to regulate the temperature and to control evaporation.^[16]

3.23. HISTORICAL BACKGROUND OF FULL WET SHEET PACK:

The Full wet sheet Pack which is accredited to Priessnitz , was actually first discovered and used by Lucas in 1750.^[17]

The pack may be administered in various methods.

The method which was in current use was employed by Winternitz, which was demonstrated to J.H. Kellog by Dr. Strasser, assistant of Winternitz and lecturer at the polyclinic at Vienna.

3.24. CHARLES LUCAS:

He was the first person who discovered and used Full wet sheet Pack in the year 1750. In 1756, he published an essay on water which was published in London being devoted to the analysis of European spas and the promotion of hydrotherapy.^[18]

3.25. VINCENT PRIESSNITZ:[Oct 4,1799 - Nov 28,1851]

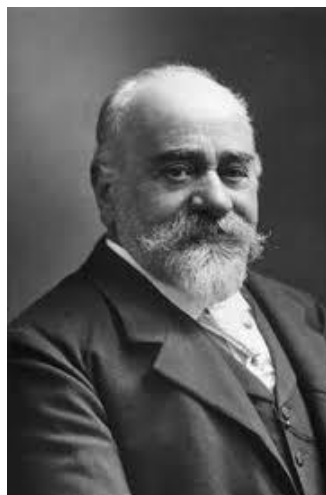


He was a peasant farmer who was working in his father's farm from his younger age once watched a wounded deer coming to the pond to heal its wound surprisingly the wound was healed . He healed his injured finger by applying wet bandages in 1814.^[19]

Later on in the year 1816 , he was injured seriously in an accident in which his ribs were broken, Local physicians gave him no hope of recovery , then he covered the affected parts with wet cloth in a short period of time he was cured completely. He used water treatments to cured many patients and also established a sanatorium in his locality. For his greater contributions in the field of hydrotherapy he was regarded as “FATHER OF MODERN HYDROTHERAPY”

In 1842, R.T. Claridge one of the patient of Priessnitz published a book “THE COLD WATER CURE, ITS PRINCIPLES, THEORY AND PRACTICE”.

3.26. WILHELM WINTERNITZ:[Mar 1,1835 - Feb 22,1917]



He was a czech - austrianjewish physician and hydropathist. He was called as “FATHER OF SCIENTIFIC HYDROTHERAPY”.^[20]

The Effect of Full Wet Sheet Pack on Pulse Rate, Body Temperature, Respiratory Rate and Peak Flow Rate in Healthy Male Individuals

Though he was practicing as surgeon in Austrian navy due to his interest towards hydrotherapy he resigned his post. He was influenced by one of Kellogg brothers involved in Battle creek sanatorium.

Winternitz clearly shown that the cooling pack is much more effective than the brand bath in reducing temperature in the gradual lowering of temperature.

3.27. CURRIE:

An English physician in the latter half of 18th century has made an intelligent and scientific study of the use of water in fevers.^[21]

He also made use of “wet blanket” or “wet packs” in fever in a most efficient way.

3.28. RAJIV RASTOGI:

In evidence based study of cold chest pack for 30 minutes over a period of time is believed to improve the lung function in bronchial asthmatic patients due to significant increase in PEFr as similar effect seen in Full wet sheet pack.^[22]

For scientific evaluation of this treatment, a study was carried out by them on 15 medication-free bronchial asthma patients (2 males) with ages from 19 to 42 years. The peak expiratory flow rate (PEFR, in l/min) was recorded before, during and after a 30 min application of a cold chest pack. This treatment was carried on for 21 days, The results suggest that an application of a cold chest pack increase the PEFr as an immediate effect.

3.29. CHRISTOPHER ELLIOT B.A., M.D.,

A Physician of The Bristol Hospital for Sick Children as treated successfully a case of hyperpyrexia following measles with Full wet sheet pack. In his evidence based study he has proved that the besides having a diaphoretic action on skin Full wet sheet pack calms the nervous centers, subduing restlessness and induces sleep.^[23]

3.30. ALFRED SHEEN M.D.,

A senior surgeon treated a case Named Mary R., aged 51/2 years suffering from Diphtheria , with Full wet sheet pack that brought great attention towards modern Hydrotherapy.^[24]

3.31. John BROOM., M.D.,

A senior Consultant from Clifton has treated successfully many cases of Delirium Tremens, Neurasthenia and alcoholics with Full wet sheet pack as rational treatment.^[25]

4. MATERIALS AND METHODS

4.1. Pulse Rate: Palpatory Method, Recorded manually from the Radial artery.

4.2. Respiratory Rate: is recorded by close observation from the movements of chest wall and abdominal wall.

4.3. Body Temperature: is recorded by using Infrared Ear thermometer.

4.4. Peak Expiratory Flow Rate (PEFR): Is recorded by using standard PEFR Meter

All the parameters were recorded before, during, and after the treatment by single setting.

4.5. SUBJECTS:

Thirty male healthy subjects between the age group 19 to 25 years participated in the study.

4.6. DESCRIPTIONS OF THE SUBJECTS INCLUDING THE SELECTION OF SAMPLES:

The study subjects were recruited from the Govt. Yoga and Naturopathy Medical College Hospital, Arumbakam , Chennai.

Thirty male healthy subjects between the age group 19 to 25 years are selected for the study from Govt. Yoga and Naturopathy Medical College Hospital, screening is done to assess diagnostic criteria, inclusion and exclusion criteria.

Each of these subjects will undergo a general health checkup to rule out any disease or abnormality.

Each subject was assessed pulse rate, body temperature, Respiratory rate, peak flow rate before and after the treatment by single setting.

4.7. SCREENING OF SUBJECTS:

CRITERIA FOR DIAGNOSIS:

- Full wet sheet pack
- (before) and (after) the treatment for 45mts

Each of the subjects would undergo full wet sheet pack for 45mts before entering the treatment drink 2-3 glass of water to prevent the dehydration. Place the wet pack on the head to prevent cerebral congestion.

4.8. INCLUSION CRITERIA:

- Aged within 19 to 25 yrs.
- Only male.

4.9. EXCLUSION CRITERIA:

- Diseased Males.
- Individual Males with Congenital abnormalities.
- Recently hospitalized.

4.10. DESIGN:

4.11. TYPE OF DESIGN:

Pre and post Experimental Study.

5. ETHICAL CONSIDERATION

5.1. ETHICAL CLERANCE:

Ethical clearance was sought from the institutional ethics committee prior to the start of the study and the approval for the same was granted.

5.2. WRITTEN INFORMED CONSENT:

Subjects were explained about the purpose of the study and their rights as research subjects. Informed consent form was administered in English. Adequate time was give to each subject (Patient) to go through the information sheet and their queries where answered.

Their right to withdraw anytime from the study and need for willingness to participate voluntarily in the study was explained.

All the subjects expressed their willingness to participate in the study by giving a signed informed consent.

(A sample information sheet and consent form in enclosed as annexure I)

6. DEMOGRAPHICS

6.1. TABLE 1:Subjects demographic and other characteristics (N=30)

Parameters	n	Mean \pm SD	Median (IQR)	(Minimum, Maximum)
Age(years)	30	22.4 \pm 1.6	22.0 (21.6, 24.0)	(20, 25)
Pulse Rate Before	30	79.7 \pm 7.3	80.5 (75.0, 85.0)	(65, 98)
Pulse Rate After	30	77.5 \pm 7.6	76.0 (72.0, 80.3)	(68, 97)
Body Temperature Before	30	36.1 \pm 0.7	36.2 (35.5, 36.5)	(34, 37)
Body Temperature After	30	35.9 \pm 0.7	35.9 (35.5, 36.3)	(34, 37.1)
Respiratory Rate Before	30	20.9 \pm 1.8	20.5 (20.0, 22.0)	(18, 26)
Respiratory Rate After	30	18.5 \pm 1.9	18.0 (17.0, 19.3)	(16, 25)
Peak Flow Rate Before	30	383.3 \pm 59.9	395.0 (350.0, 440.0)	(230, 470)
Peak Flow Rate After	30	355.6 \pm 73.6	365.0 (315.0, 412.5)	(170, 460)
IQR= (25 Percentiles, 75 Percentiles)				

7. STATISTICAL ANALYSIS

For continuous data such as age, the descriptive statistics n, Mean, SD, Median, IQR, Minimum and Maximum was presented. Based on the normality of change data, the parametric paired t test and non-parametric Wilcoxon signed rank test was applied to the data. Age distribution was presented. All tests was two-sided at $\alpha=0.05$ level of significance. All analyses were done using Statistical Package for Social Services (SPSS) software Version 21.0 (Armonk, NY: IBM Corp).

7.1. DATA POINTS:

The data collection was done before and after the treatment of wet sheet pack

7.2. ILLUSTRATION OF DATA POINTS:

Before single setting\wet sheet pack after wet sheet pack 45 mts.

7.3. ASSESEMENT:

The base line and post intervention assessment consists of:

1. pulse rate
2. body temperature
3. respiratory rate
4. peak flow rate

8. INTERVENTION

8.1. TEST INTERVENTION AND BENEFITS OF INTERVENTIONS:

The volunteers are made to lie down and securely wrapped in the wet sheet pack for 45mts place wet pack on the head

8.2. PROCEDURE OF TEST INTERVENTION

REQUISITES:

- One large double blanket
- One single blanket
- Two large sheets
- Two -three gallons of water (60 - 70 F)
- One plastic sheet (if the procedure is done on bed)

PROCEDURE:

Step 1: A Lengthwise folded sheet is laid across the couch near its head. The upper end of the sheet should cover the lower third of the pillow, placed at the head of the couch.

Step 2: Next the double blanket is spread out and placed across the couch. The upper edge of the blanket should fall two inches below the upper edge of the dry sheet.

Step 3: Then the linen sheet should be spreaded upon the blanket, the upper end falling an inch or two below the upper edge of blanket.

Step 4: Then the patient lies down upon the sheet in such a way that the upper edge of the wet sheet three inches above the shoulder.

Step 5: The patient should raise both the arms above his head while the attendants draw one side of the sheet across the body and tucking it closely all the side of the body from the hips down, the edge of the sheet tucked snugly around the leg of corresponding side ,leaving the other side uncovered.

Then the patient lowers his arms and holds them close by his side while the other side of the sheet is passed over and tucked in at the side and around the uncovered leg. A fold is made in the sheet over each shoulder so as to make it fit the neck closely. So that the body is completely and closely enveloped by sheets.

Step 6: Then the blanket is drawn across the patient and tucked under the shoulder, side and around the legs.

Step 7: Then the long end of the blanket is tucked around the patient, being wound about him two or more times like a windling sheet.

Step 8: The blanket is next doubled under at the foot and the dry sheet at the head is brought around with a neat fold over each shoulder and tucked under the shoulder so as to protect the skin of face and neck from the contact with blanket and completely to exclude the air.

Step 9: For additional warmth, a woolen blanket is folded once, laid lengthwise across the patient and tucked under the shoulders, sides and about the legs.

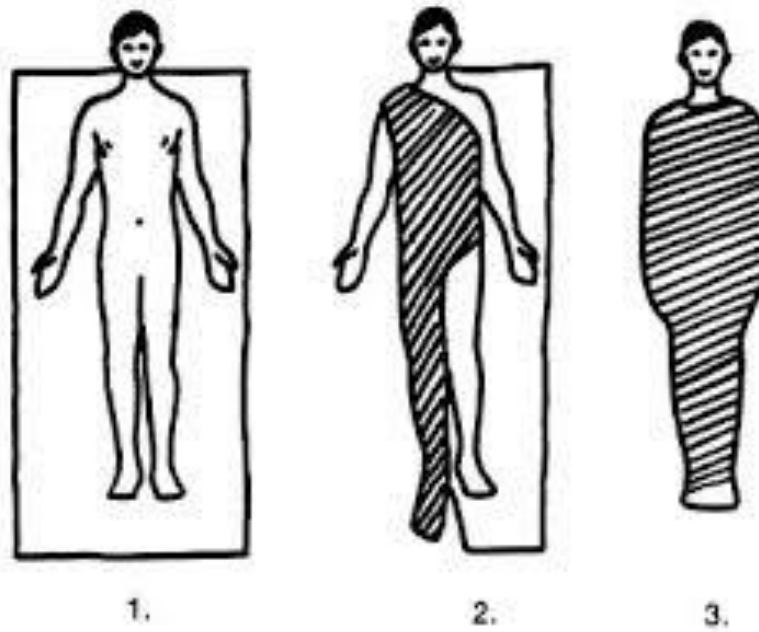


Fig : 12 Methods of Rapping the Wet Sheet Pack

DURATION:

The duration of the pack will depend upon the effects desired. For tonic effect the usual length of the application should be 20 minutes or until the patient feels a general glow induced by the return of the blood to the skin and sensation of comfort and well being which marks the beginning of the reaction.

If exciting or heating effects are desired the patient should remain in pack until the perspiration begins.

If the effect desired is elimination, then the pack may be continued for one or two hours or even longer or so long as sweating continues, if the strength of the person will permits.

HOW DOES IT WORK:

One of the notable theory that emerged was that OSMOSIS, contributed to the effects of water. The skin was thought to be act as a membrane and the impurities in the body would flow out into pure water applied by bandages.

As the wet sheet induces perspiration it removes the toxins from the body as sweat in normal individuals.

HOW IT INDUCES SEDATION:

Full wet sheet Pack is an effective means of quieting nervous system accomplished by lessening the blood supply of the brain that slows the respiration and heart rate, which lessens the reflex irritability and activity of cerebral ganglia , that increase the quality of lymph in brain This supplies the condition essential for sleep.

The Effect of Full Wet Sheet Pack on Pulse Rate, Body Temperature, Respiratory Rate and Peak Flow Rate in Healthy Male Individuals

STAGES:

The time occupied in the development of various phases of the procedure may be divided into 4 periods, which are characterized as follows:

1. Cooling / Anti Pyretic
2. Neutral
3. Heating
4. Sweating

COOLING /ANTI PYRETIC STAGE:

It is otherwise called as tonic stage. In which the duration should be less than 15 minutes. In this stage, the heat is rapidly abstracted from the body and powerful thermic reaction is induced. The effects produced during the cooling / refrigerative stage of the pack are intensively alternative in character.

If this pack is arrested during or at the end of the stage or when the reaction begins the general effects produced will be tonic and will be essentially same as that of a cold bath of same temperature provided.

If the process is arrested as soon as the reaction begins, that is at the end of 8-12 minutes, a freshly cooled sheet being applied the effect is powerfully anti thermic and anti febrile.

THERAPEUTIC APPLICATIONS:

It is indicated in diseases as

- Anemia
- Tuberculosis
- Convalescence
- Fever
- Chronic toxemia
- Dyspepsia
- Chronic liver disease
- Toxemia of chronic malarial infection
- Diabetes
- Neurasthenia
- Scurvy
- Chronic gastritis
- Hypopepsia
- General paresis
- Constipation

SECOND STAGE /NEUTRAL STAGE:

The second or neutral stage begins when the temperature of the wrapping and the warm moist air that surrounding the patient reaches a point approximately of the body or 92 F.

The neutral effects are produced when the pack is continued more than 30 minutes. The effect during this period is same as that of neutral bath. It is quieting, calmative and productive of a disposition to sleep.

THERAPEUTIC APPLICATIONS:

If the neutral pack is continued till the end of second stage, it is useful in

- Insomnia
- Acute mania
- Melancholia
- Neurasthenia
- Delirium of typhoid fever
- Pneumonia
- Epilepsy
- Chorea
- Tetany

THIRD STAGE / HEATING STAGE:

When the third stage is prolonged that of superheating is produced if, the pack is continued for more than 1 hour. The body temperature is slightly elevated as heat elimination is more and more interfered with and the excitant effects of temperature above 98 F.

As the excitant resulting from the accumulation of heat increases still further, the skin becomes more and more active, until the perspiratory glands are so excited that visible perspiration appears.

THERAPEUTIC APPLICATIONS:

If the Full wet sheet Pack is continued until the end of third stage, it is more useful as a preparation for tonic applications.

It may be employed in

- Cerebral congestion
- Hepatic and splenic congestion
- Chronic malarial infection
- Constipation
- Haemorrhoids
- Abdominal dropsy
- Measles
- Scarlet fever
- Small pox

FOURTH STAGE /SWEATING STAGE:

The forth stage / sweating stage occurs when the pack is continued for more than 1 1/2 hours. This stage may be prolonged by making the patient to drink a glassful of water every half an hour.

The head should not be cooled excessively and extra blanket may be applied. If necessary to increase the accumulation of heat, in cases where the skin is inactive, so the perspiration is long delayed. Several hot water bottles may be placed about the patient inside the dry blanket and the patient is made to drink copious amount of hot water or hot lemonade.

THERAPEUTIC APPLICATIONS :

It is highly spoliative & eliminative and is valuable in cases of

- Chronic bronchitis with cough
- Chronic pneumonia
- Pleurisy
- Intestinal catarrh
- Congestion of liver and spleen
- Cerebral hyperemia
- Jaundice

CONTRA INDICATIONS:

The cold Full wet sheet Pack cannot be employed for the patients whose vital resources are small.

In case of very feeble person or very nervous person one or both of the arms may be left out (should not be included in the blanket) to avoid chilling.

PRECAUTIONS:

Some special precautions may be employed without difficulty in cases in which untoward effects might otherwise be produced.

Parts that are sensitive to cold may be protected with dry clothes. Parts that require special protection are

- Spine in spinal irritation
- Heart when very excitable
- Sensitive surface in feeble patients
- In asthmatics
- Hyperesthesia

8.3. VARIOUS FORMS OF APPLICATION:

THE COOLING PACK:

If it is desired to apply the pack as antipyretic, it is applied in the same way as cold Full wet sheet Pack but must be interrupted before the end of first stage.

To secure the pronounced antipyretic effects, water at 60-70 F is used. The patient should be covered with only two thickness of blanket, so as to allow slight cooling through a moderate amount of evaporation, but care should be taken to prevent the entrance of air about the neck so as to avoid the undue chilling of the part .

THERAPEUTIC APPLICATIONS:

- Typhoid fever
- Erysipelas
- Dengue
- Malaria
- Yellow fever
- Plague
- Acute bronchitis
- Influenza

THE COLD SHOWER PACK:

When antipyretic effects are desired, instead of removing the sheet from the patient for rewetting, the same results may be accomplished, so rapidly, by opening the sheet and sprinkling the body as well as sheet with cold water. The temperature should be 60-65 F.

If the patient does not able to tolerate very cold water, a temperature of 70 - 80 F or even 85 F will be found efficient.

Its therapeutic applications are same as that of cooling pack.

THE SWEATING PACK:

When it is desired to produce powerful eliminative effects by means of Full wet sheet Pack, the application may be made in the same way as Full wet sheet Pack but with an exception that more covers are employed, to encourage the reaction and it is generally wise to place hot bags at patient's feet and sides.

THERAPEUTIC APPLICATIONS:

- Obesity
- Rheumatism
- Gout
- Chronic toxemia
- Neurasthenia
- Ascities

- Amyloid liver
- Bell's palsy
- Myelitis
- Meningitis
- Epilepsy

CONTRAINDICATIONS :

Should be avoided in case of

- Cardiac disease
- General cutaneous hyperesthesia

THE DRY PACK:

In this application the patient is completely enveloped with dry blankets, the head is excluded. The purpose of this pack is to lessen heat elimination and thus produce an accumulation of bodily heat and in some cases to induce perspiration .

THERAPEUTIC APPLICATIONS :

- Shock
- Collapse after hemorrhages
- Paralysis
- Paraplegia

- Cold stage of intermittent fever
- Arteritis / phlebitis in typhoid
- Septicemia
- Obesity

PRECAUTIONS:

The pack should not be continued too long period / too great amount of heat should not be applied, as the body temperature may rise to an injurious degree.

When employed to produce perspiration the dry pack should not be used more frequently than once / twice in a week except obesity.

CONTRAINDICATIONS:

- Cerebral congestion
- Heart disease
- Eruptive disorders of skin
- Extremely nervous persons

THE HALF PACK:

This procedure is same as that of Full wet sheet Pack with an exception that it is confined to the trunk and hip, the arms being excluded from the body. Hence it is called as “TRUNK PACK”.

THERAPEUTIC APPLICATIONS:

The pack is of greater value in insomnia and nervous disorders.

THE HOT BLANKET PACK:

It consists of an envelopment of the body in a woolen blanket wrung out of water as hot as can be endured by the patient without pain or injury .It diminishes heat elimination and increases heat production.

It differs from sweating Full wet sheet Pack in that its action as an exciting where as Full wet sheet Pack is primarily sedative.

THERAPEUTIC APPLICATIONS:

It is useful in all cases in which the temperature is subnormal.

- convulsion in children
- acute bright's disease
- albuminuria of pregnancy
- infectious fevers
- peritonitis
- renal calculus
- acute myelitis
- lobar pneumonia

CONTRAINDICATIONS AND PRECAUTIONS:

Care must be taken not to burn the patient by wringing the blanket out of water at too high temperature.

It must not be forgotten that the hot blanket pack like other general hot applications, although primarily stimulating is ultimately exhausting and depressing.

9. DATA EXRATION & ANALYSIS

9.1 DATA EXTRACTION:

The data was collected as self reported observations the assessments were done before and after the treatment of wet sheet pack. The data was organized in Microsoft excel-sheet.

9. 2. DATA ANALYSIS:

For continuous data such as age the descriptive statistics mean, SD, median, IQR, minimum and maximum was presented. Based on the normality of change data, the parametric paired to test and non- parametric wilcovon signed rank test wasapplied to the data. Age distribution was presented. All tests was two sided at $\alpha = 0.05$ level of significance. All analysis was done using statistical package for social services (spss).

Statistics

		Age(years)	Pulse Rate Before	Pulse Rate After	Body Temperature Before
N	Valid	30	30	30	30
	Missing	0	0	0	0
Mean		22.37	79.70	77.53	36.05
Median		22.00	80.50	76.00	36.20
Std. Deviation		1.564	7.316	7.583	.735
Minimum		20	65	68	34
Maximum		25	98	97	37
25		21.75	75.00	72.00	35.50
Percentiles 50		22.00	80.50	76.00	36.20
75		24.00	85.00	80.25	36.50

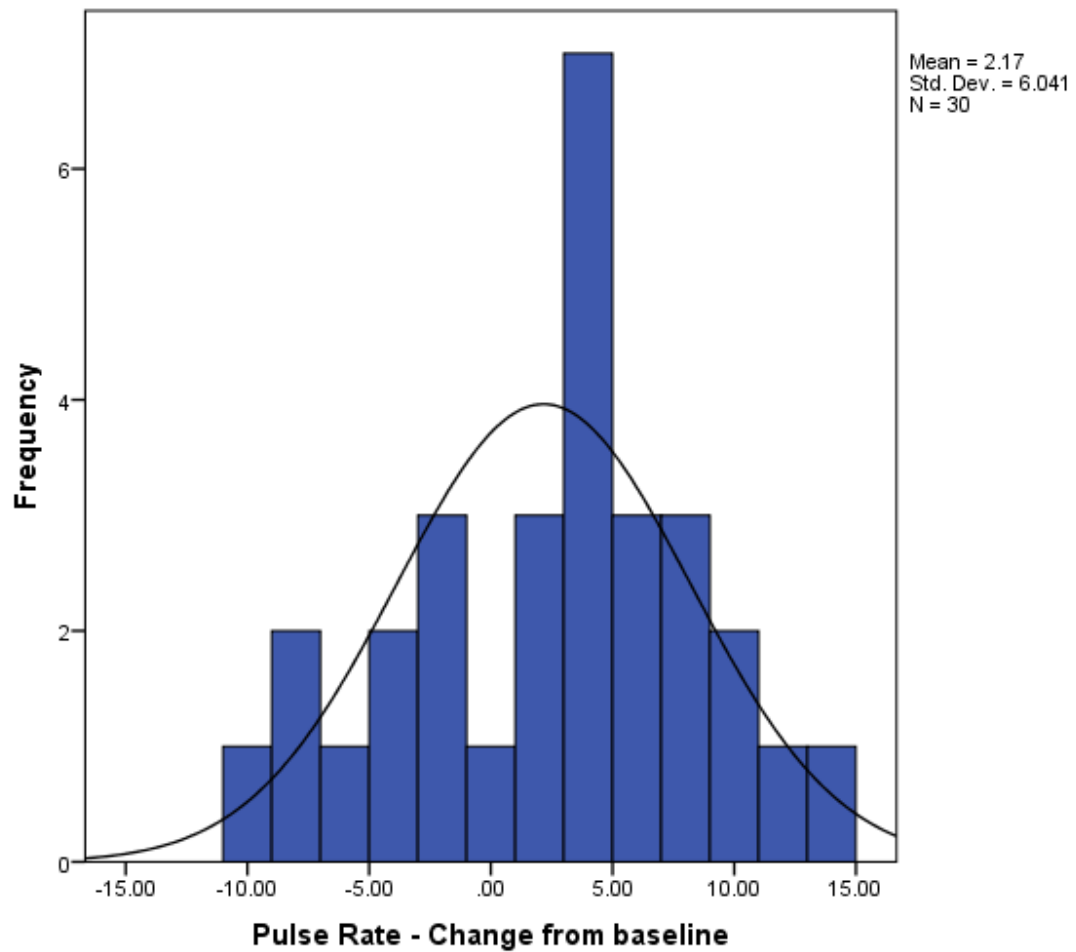
Statistics

		Body Temperature After	Respiratory Rate Before	Respiratory Rate After	Peak Flow Rate Before
N	Valid	30	30	30	30
	Missing	0	0	0	0
Mean		35.853	20.90	18.53	383.27
Median		35.900	20.50	18.00	395.00
Std. Deviation		.7491	1.768	1.978	59.990
Minimum		34.0	18	16	230
Maximum		37.1	26	25	470
Percentiles	25	35.500	20.00	17.00	350.00
	50	35.900	20.50	18.00	395.00
	75	36.275	22.00	19.25	440.00

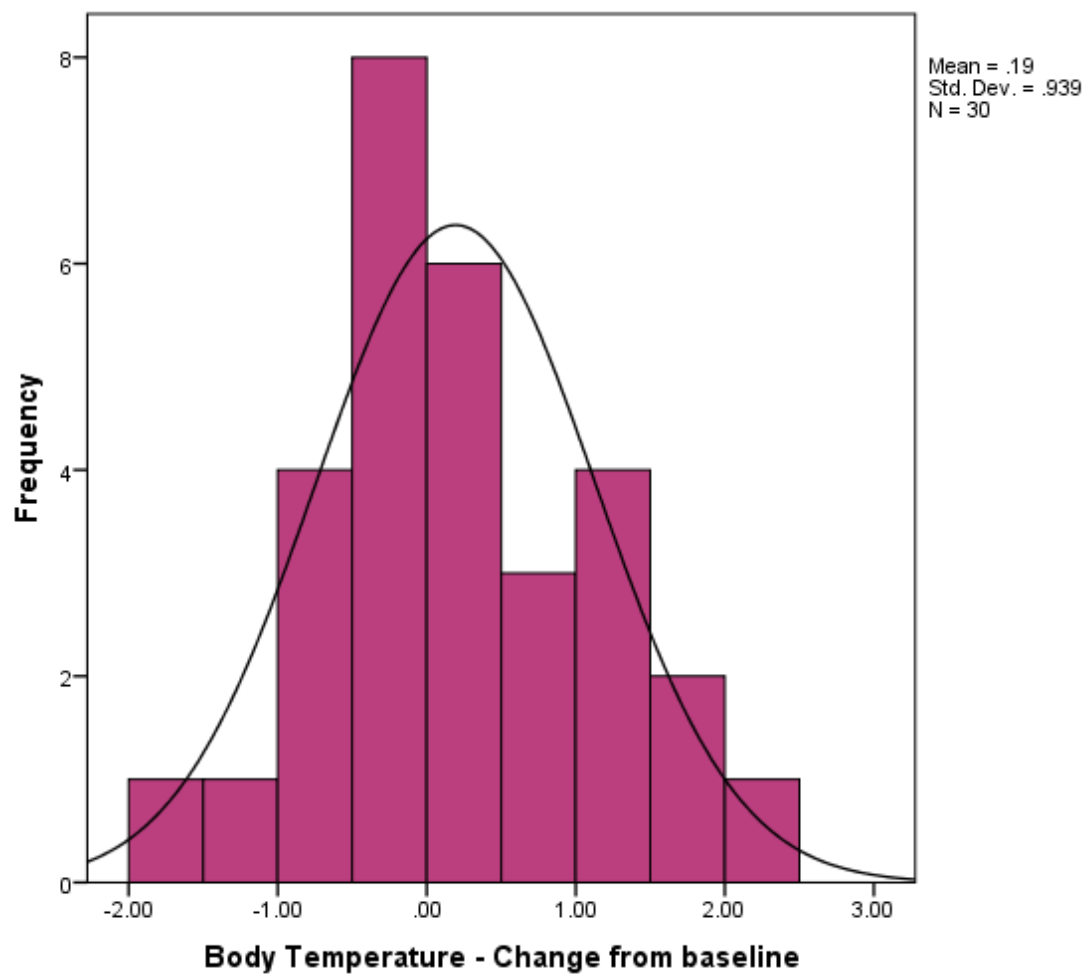
Statistics

	Peak Flow Rate After	PR_Change	BT_Change	RR_Change	PFR_Change
N	30	30	30	30	30
Valid					
Missing	0	0	0	0	0
Mean	355.63	2.1667	.1933	2.3667	27.6333
Median	365.00	3.0000	.0500	2.0000	30.0000
Std. Deviation	73.576	6.04057	.93879	1.49674	34.60764
Minimum	170	-10.00	-2.00	-3.00	-50.00
Maximum	460	13.00	2.30	5.00	80.00
25	315.00	-3.0000	-.3500	2.0000	7.5000
Percentiles 50	365.00	3.0000	.0500	2.0000	30.0000
75	412.50	6.2500	.8500	3.0000	50.0000

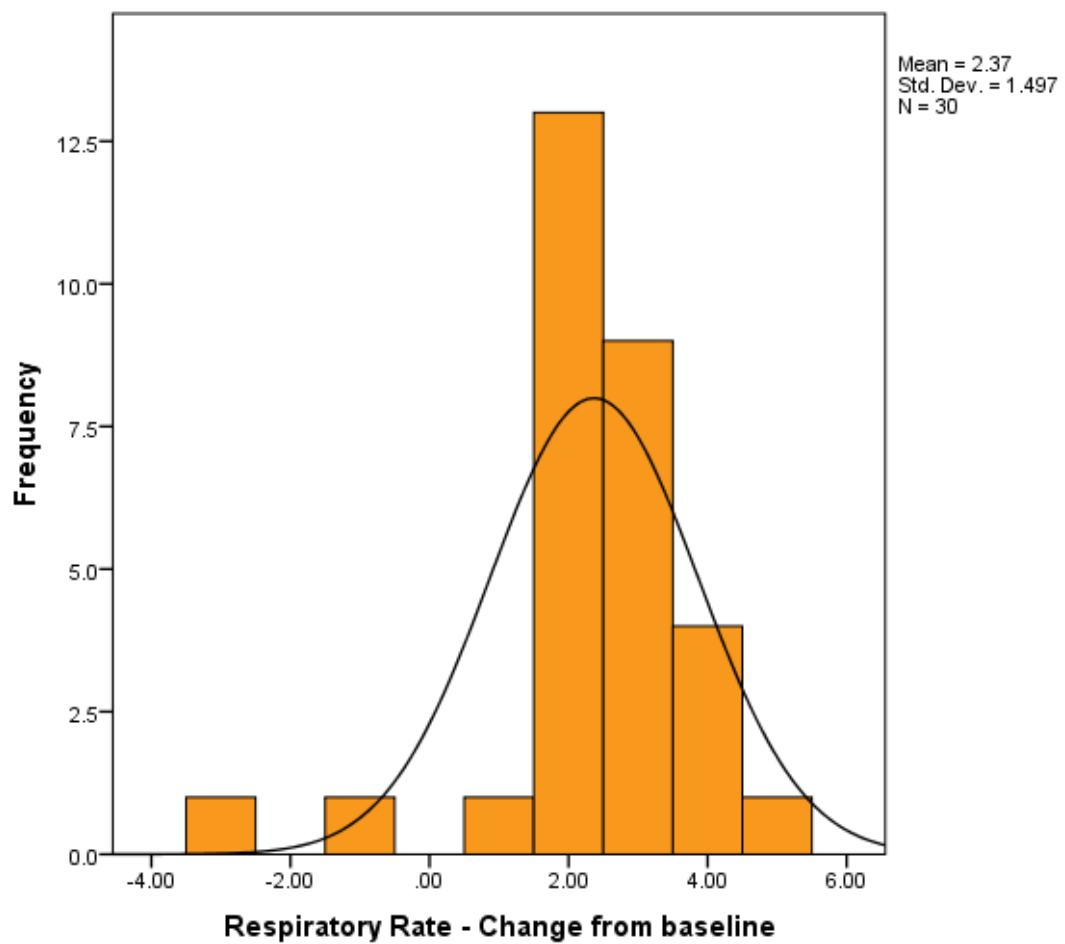
Graph



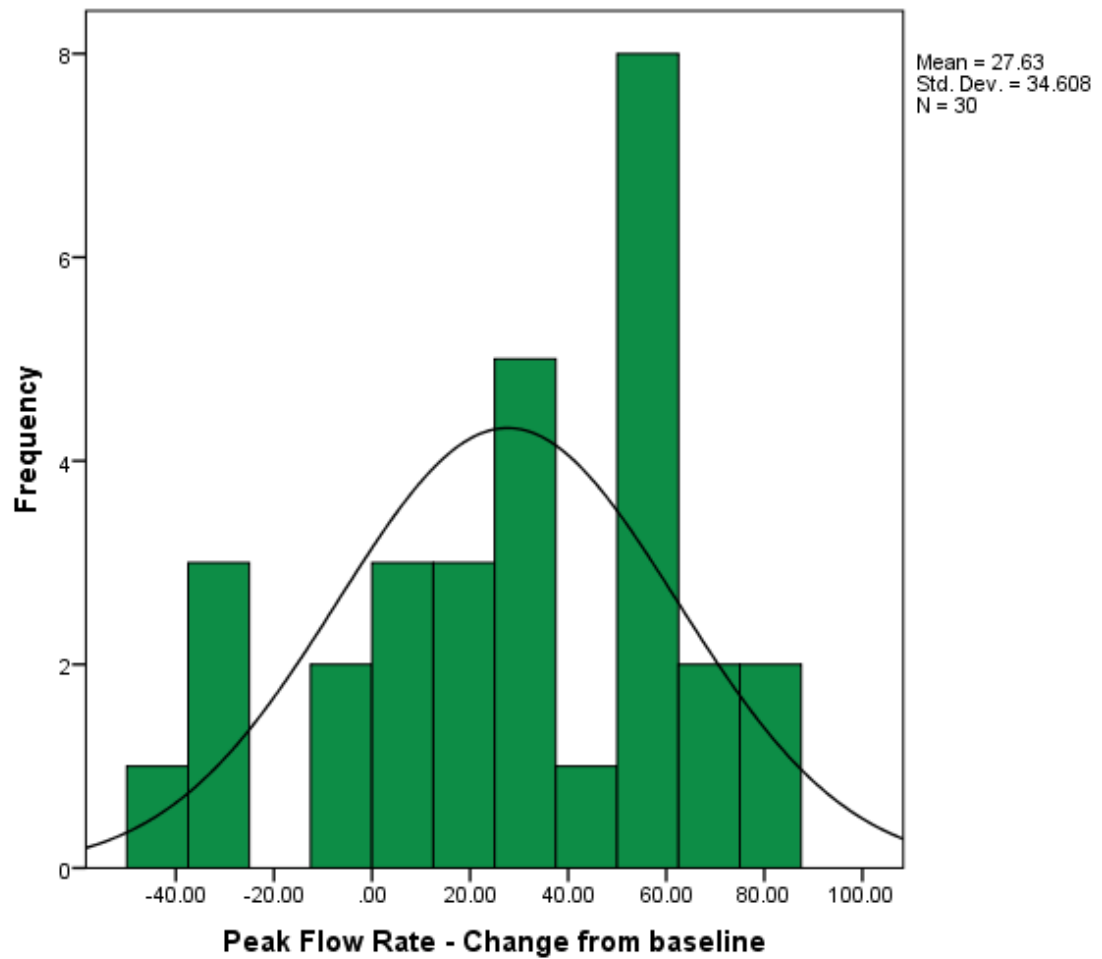
Graph



Graph



Graph



T-TEST

Paired Samples Statistics

	Mean	N	Std.Deviation	Std.Error Mean
Pair 1 Pulse Rate Before	79.70	30	7.316	1.336
	Pulse Rate After	77.53	30	7.583
Pair 2 Body Temperature Before	36.05	30	.735	.134
	Body Temperature After	35.853	30	.7491
Pair 3 Respiratory Rate Before	20.90	30	1.768	.323
	Respiratory Rate After	18.53	30	1.978

Paired Samples Test

	Paired Differences			
	Mean	Std.Deviation	Std.Error Mean	95% Confidence Interval of the Difference
				Lower
Pair 1 Pulse Rate Before- Pulse Rate After	2.167	6.041	1.103	-.089
Pair 2 Body Temperature Before - Body Temperature After	.1933	.9388	.1714	-.1572
Pair 3 Respiratory Rate Before - Respiratory Rate After	2.367	1.497	.273	1.808

Paired Samples Test

		Paired Differences	t	df	Sig. (2-tailed)
		95% Confidence Interval of the Difference			
		Upper			
Pair 1	Pulse Rate Before- Pulse Rate After	4.422	1.965	29	.059
Pair 2	Body Temperature Before - Body Temperature After	.5439	1.128	29	.269
Pair 3	Respiratory Rate Before - Respiratory Rate After	2.926	8.661	29	.000

NPar Tests

Wilcoxon Signed Ranks Test

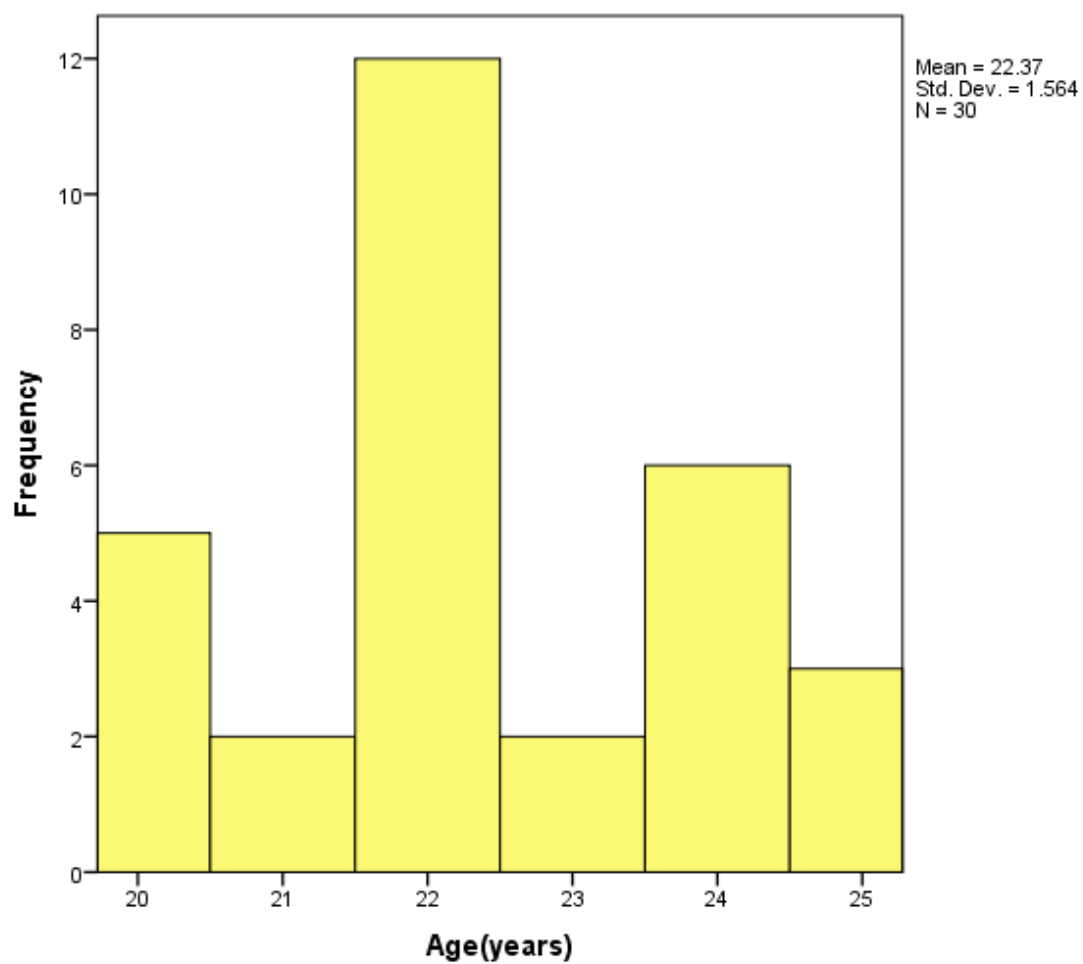
Test Statistical

	Peak Flow Rate After - Peak Flow Rate Before
Z	-3.397 ^b
Asymp. Sig. (2-tailed)	.001

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

Graph



10. INTERPRETATION

Single setting of before and after the treatment of wet sheet pack showed dominance changes in the pulse rate, respiratory rate and the peak flow rate. Minimal changes in the body temperature.

11. RESULT

The present study was conducted to evaluate whether the Full Wet Sheet Pack has any physiological effect on Pulse Rate, Body Temperature, Respiratory Rate and Peak Flow Rate in healthy male individuals. The experiment result showed a significant improvement in Pulse Rate, Respiratory Rate, Peak Flow Rate ($p < 0.05$), whereas no significant improvement in the body temperature ($p > 0.05$).

11.1.TABLE 1: Analysis of change from baseline to post baseline using parametric test (N=30)

Parameter	Time Point	Mean \pm SD	95% Confidence Interval of the Difference	P value*
Pulse Rate	Baseline	79.7 \pm 7.3		
	Post baseline	77.5 \pm 7.6		
	Change from baseline to post baseline	2.2 \pm 6.0	(-0.09, 4.42)	0.05
Body Temperature	Baseline	36.1 \pm 0.7		
	Post baseline	35.9 \pm 0.7		
	Change from baseline to post baseline	0.2 \pm 0.9	(-0.16, 0.54)	0.27
Respiratory Rate	Baseline	20.9 \pm 1.8		
	Post baseline	18.5 \pm 1.9		
	Change from baseline to post baseline	2.4 \pm 1.5	(1.81, 2.93)	<0.0001
*Obtained from Paired t test				

The Effect of Full Wet Sheet Pack on Pulse Rate, Body Temperature, Respiratory Rate and Peak Flow Rate in Healthy Male Individuals

11.2.TABLE 2:Analysis of change from baseline to post baseline using non parametric test (N=30)

Parameter	Time Point	Median(IQR)	P value*
Peak Flow Rate	Baseline	395.0 (350.0, 440.0)	
	Post baseline	365.0 (315.0, 412.5)	
	Change from baseline to post baseline	30.0 (7.5, 50.0)	0. 001
*Obtained from Wilcoxon signed rank test			

12. DISCUSSION AND CONCLUSION

The desired result showed by the pre and post treatment effect of Full Wet Sheet Pack is Sedative. As indicated by significant improvement in Pulse Rate, Respiratory Rate and Peak Flow Rate, the treatment measure can be effectively employed to attain desired Cooling effect by continuing treatment for duration of 8 – 12 min and Neutral effect by prolonging the treatment for 30 min and Heating effect for a duration of 45 min and Sweating effect by prolonging for 45 min and above maximum for a duration of 1½ hours. So that Full Wet Sheet Pack can be an effective mode of Hydrotherapeutic treatment in Naturopathy which can be indicated to cure various conditions like fever (Cooling or Antipyretic stage), Insomnia (Neutral stage), Chronic Malarial Infection (Heating stage), Chronic Bronchitis with Cough (Sweating stage), based on the significant circulatory and thermic reactions of Full Wet Sheet Pack incurred from 15 – 45 min of its applications. This is a first experimental study to develop more extensive study for large samples to understand and apply the same in clinical use.

13. ANNEXURES

13.1. ANNEXURE 1: INFORMED CONSENT FORM

Title of the study: **“The Effect of Full Wet Sheet Pack on Pulse Rate, Body Temperature, Respiratory Rate and Peak Flow Rate In Healthy Male Individuals”.**

Name of the Participant:

Name of the Principal Investigator : Dr. T. POORNIMA

Name of the Institution : Government Yoga and Naturopathy Medical
College Hospital, Arumbakkam, Chennai-
600106

Documentation of the informed consent

I _____ have read the information in this form (or it has been read to me). I was free to ask any questions and they have been answered. I am over 18 years of age and, exercising my free power of choice, hereby give my consent to be included as a participant in the study of **“The Effect of Full Wet Sheet Pack on Pulse Rate, Body Temperature, Respiratory Rate and Peak Flow Rate In Healthy Male Individuals”.**

1. I have read and understood this consent form and the information provided to me.
2. I have had the consent document explained to me.

3. I have been explained about the nature of the study.
4. I have been explained about my rights and responsibilities by the investigator.
5. I have been informed the investigator of all the treatments I am taking or have taken in the past _____ months including any native (alternative) treatment.
6. I have been advised about the risks associated with my participation in this study.
7. I agree to cooperate with the investigator and I will inform him/her immediately if I suffer unusual symptoms.
8. I have not participated in any research study within the past _____ month(s).
9. I am aware of the fact that I can opt out of the study at any time without having to give any reason and this will not affect my future treatment in this hospital.
10. I am also aware that the investigator may terminate my participation in the study at any time, for any reason, without my consent.
11. I hereby give permission to the investigators to release the information obtained from me as result of participation in this study to the sponsors, regulatory authorities, Govt. agencies, and IEC. I understand that they are publicly presented.

INFORMATION SHEET

We are conducting a study: **“The Effect of Full Wet Sheet Pack on Pulse Rate, Body Temperature, Respiratory Rate and Peak Flow Rate in Healthy Male Individuals”** at Government Yoga and Naturopathy Medical College Hospital, Chennai.

The purpose of this study is to evaluate the effectiveness of the Effect of Full Wet Sheet Pack on Pulse Rate, Body Temperature, Respiratory Rate and Peak Flow Rate in Healthy Male Individuals. Here we collect vitals before and after the full wet sheet pack.

The privacy of the patients in the research will be maintained throughout the study. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared. Taking part in this study is voluntary.

You are free to decide whether to participate in this study or to withdraw at any time; your decision will not result in any loss of Benefit to which you are otherwise entitled. The results of the special study may be intimated to you at the end of the study period or during the study if anything is found abnormal which may aid in the management or treatment.

Signature of investigator

Signature of participant

Date :

Place : GYNMCH, Chennai-600106.

13.3: ANNEXURE 2: SOCIO DEMOGRAPHIC DATA SHEET

1. ID. No :

2. Reg. No :

3. Date of Birth :

4. Age :

5. Sex :

6. Religion :

7. Educational Status :

8. Occupation :

9. Monthly income :

10. Marital status :

11. Languages known :

12. Postal address :

a. Landline :

b. Mobile :

c. Email :

13.4: ANNEXURE 3: CARDIAC VARIABLES (RAW DATA)

SI.NO	NAME	AGE	PR (B.I)	PR (A.I)	BT (B.I)	BT (A.I)	RR (B.I)	RR (A.I)	PFR (B.I)	PFR (A.I)
1	Vigneswaran	22	67	75	36	36.5	20	16	430	420
2	Akshay Varma	22	81	68	34.9	35.5	21	18	358	329
3	Muthuraj	24	76	74	36.5	36.1	21	17	350	380
4	Ravikumar	21	87	83	36.5	36.7	19	20	350	300
5	Muneeswarapandi	20	68	71	36.4	36.1	26	25	450	400
6	Velan	20	77	76	35.5	36.2	20	18	360	330
7	Maveeran	20	85	81	35.5	35.5	18	16	470	460
8	Maniraj	24	80	72	35.5	35.8	22	17	350	320
9	Jayapal	23	71	75	34	36	20	18	400	450
10	Deenadhayalan	22	98	93	37	37.1	21	19	300	330
11	Bharath	24	75	77	34.1	34	19	22	450	460
12	Thirumalai	24	85	92	36.1	36.8	22	19	440	420
13	Venkatesan	22	87	75	36	36.8	24	22	400	410
14	Sumanraj	22	81	89	35.3	36.8	22	20	320	280
15	Mohan	22	65	68	36.5	35.5	20	18	390	320
16	Madesh	22	87	97	36.5	34.9	20	17	420	450
17	Praveen	22	90	88	36.6	34.3	22	18	450	450
18	Rajesh	22	85	76	36.5	36.6	19	16	280	200
19	Aruldas	22	85	79	36.1	36.2	20	18	230	170
20	Kannadasan	22	75	75	36.8	35.5	20	18	450	400
21	Nadhan	25	75	72	36.1	34.5	20	18	400	380
22	Ramesh	24	83	73	36.6	35.8	24	20	440	380
23	Kavinkumar	25	75	72	36.1	36.2	22	19	280	250
24	Rajendran	24	76	68	36.5	35.5	21	18	390	340
25	Kannan	25	85	78	35.5	35.8	22	20	400	350
26	Natarajan	23	76	80	36.6	36.2	18	16	450	380
27	Ramanathan	20	80	76	36.5	36.2	22	19	380	330
28	Muthukumar	20	82	78	36.8	35.5	20	18	400	380
29	Rajan	21	82	76	36.1	35.5	22	19	330	300
30	Kumar	22	72	69	36.3	35.5	20	17	380	300
	PR - Pulse Rate									
	RR - Respiratory Rate									
	BT - Body Temperature									
	PFR - Peak Flow Rate									

14. BIBLIOGRAPHY

1. Kellogg, J.H., M.D., *Superintendent* (1908). The Battle Creek Sanitarium System. History, Organisation, Methods. *Michigan: Battle Creek*. Retrieved 2009-10-30.
2. Angus Stevenson, ed. (2007). "Definition of Water Cure". Shorter Oxford English Dictionary. 2: N-Z (6th ed.). Oxford: Oxford University Press. p.3586. ISBN978-0-19-920687-2.
3. Gyton & Hall, ed (2012). Text book of Medical Physiology, 12th Edition.
4. Arnaud Lobary & David Cohen, Department of Child and adolescent psychiatry, University of Pierre at Marie Curie. Effect of Wet sheet pack in children and adolescents with severe auto/Hetro aggressive behavior: an Exploratory Approach.
5. Christopher Elliott, B.A., M.D., Physician to the Bristol Hospital for Sick Children. A Case of Hyperpyrexia following Measles, Treated successfully by the Wet Sheet Pack and Cold Douche.
6. Rajiv Rastogi, CCRYN, No. 61-65, Institutional Area, Janakpuri, New Delhi-58, India. Current Approaches of Research in Naturopathy.

7. Lindlahr H (1990) Philosophy and Practice of Nature Cure. Sat Sahitya Sahayogi Sangh, Hyderabad, AP, India.
8. Manjunath NK, Telles S (2006) Therapeutic Application of a Cold Chest Pack in Bronchial Asthma. W J Med Sci 1: 18-20.
9. (2008) Research Methodology in Naturopathy & Yoga. CCRYN publication, New Delhi, India.
10. Lindlahr H (1995) Practice of Natural Therapeutics. Sat Sahitya Sahayogi Sangh, Hyderabad, AP, India.
11. *Dixler, Hillary (17 June 2016). "A Brief History of the Wet-Nap, Barbecue Sauce's Worst Nightmare".*
12. Agustina Ayu Purwaningsih, International Journal of Research in Medical Sciences, 3 December 2015. Effect of Warm and Cold Compress to reduce laceration and pain.
13. Ross DR. et al. Am J Psychiatry, 1988. The Psychiatric uses of Cold Wet Sheet Packs, Published by PubMed (www.ncbi.nlm.nih.gov/pubmed/3341470).
14. Nature Cure by Henry Lindlahr., M.D, 1913. Philosophy and Practice based on the Unity of Diseases and Cure.